MAINTENANCE ISSUE

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ELECTRIC RAILWAY JOURNAL

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In 1926 Better Paved Track will *cost less*

IN ONE city Steel Tie Track is being put down for 13% less than wood ties in stone ballast.

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Cleveland, Ohio

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The use of electricity for all lighting purposes has steadily and rapidly gained ground since the days of the first practical application of the incandescent principle. The electric light and power industry has never hesitated to scrap obsolete methods and equipment to make way for the more modern.

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so also in the railway industry must obsolete equipment be replaced. In 1923 BRITTON I. BUDD, then President of the American Electric Railway Association, sounded the keynote of modern progress for our industry when he said that—

the electric railway industry must modernize and merchandise.

The car is the first place to modernize, as it is with the car that we must merchandise. It has been definitely proven that new, modern, light-weight cars create new traffic —the reason is a superior service to the rider.

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Modern street cars attract patronage

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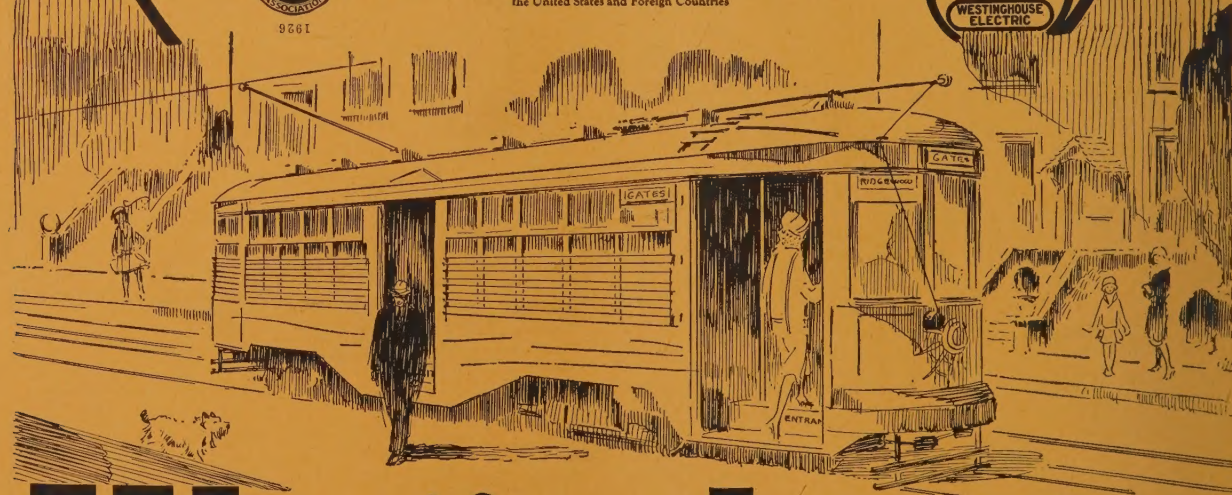

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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MORRIS BUCK, *Managing Editor*

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Car Floors Can Be Given Increased Attention

FLOOR coverings of some rubber material or linoleum are being tried by many railways to replace the ordinary wooden floor with raised slats. This improves the appearance considerably and has an added advantage in reducing noise. Some difficulties have been experienced from uneven wear and a tendency to warp and buckle. Costs of keeping such floors in good repair are not available, but definite figures as to the cost of maintaining them are looked forward to with interest.

Trapdoors are considered an eyesore by most transportation departments but a necessity by the mechanical departments. Since they are required for proper inspection of motors they should be given particular attention so as to harmonize with the remaining floor area and not create the impression on passengers that they are something to be avoided.

Whatever type of floor is used it requires careful design to prevent the openings for trapdoors from gradually showing worn and soiled edges. Of course the openings are included for a specific purpose, and if they are not used they are of no value. But care in the selection of the floor covering and care in maintaining it will do much to prevent unsightliness.

Removal of Obstructions from Car Interior Should Give More Pleasing Impression

VARIOUS arrangements of stanchions and barriers have been used on car platforms for directing passenger movement. By separating incoming and outgoing passengers less confusion and more satisfactory operation usually result. In general, however, such barriers are looked upon with disfavor by passengers. People resent the impression of being penned up or herded. Several railways have improved conditions by a removal of some of the barriers and a rearrangement of the remaining ones. The change can be made in a manner that will remove the source of annoyance and still retain most of the good features of the plan.

The problem of keeping stanchions and barriers in good condition is a difficult one, but nevertheless it should receive more attention. Porcelain enameling appears to be satisfactory only for straight lengths of pipe. It also is likely to chip, and when it does so the exposed iron is unsightly. Aluminum and brass oxidize and become unsightly, galvanizing is unsatisfactory and iron pipes with enamel paint leave much to be desired. Light colors, while they have a most pleasing appearance when kept fresh, require constant cleaning. Dark colors are easier to maintain but do not create the pleasing impression that is so desirable when a passenger boards the car. Altogether designs of stanchions and barriers leave much room for improvement.

The arrangement of railings and hand straps inside the car is another thing that may create an unfavorable impression on the passengers and give a ragged, unfinished appearance to the car that is entirely out of harmony with the modern trend toward light weight and pleasing design. A judicious arrangement of such equipment will increase the range of vision and give a more satisfactory appearance.

High-Pressure Salesmanship Needed in the Electric Railway Field

ONLY a few years ago efforts on the part of electric railway executives toward the merchandising of transportation were practically nil. The street car afforded the only convenient means of transportation for the majority of urban and interurban passengers. The electric car had no important competitor and the passenger no choice in his method of travel, as it was necessary for him to utilize such facilities as existed. Knowledge that the public was compelled to use electric cars became so firmly imbedded in the rank and file of street railway employees that it has been most difficult to change this attitude. Advent of the private automobile and later the luxurious bus created an entirely new situation. The riding public has in many cases been in a position to choose its transportation medium, and naturally its choice has been with the more attractive and pleasing vehicle. Passengers are no longer satisfied with any antiquated, noisy, hard-riding vehicle on wheels, but demand speed, comfort and cleanliness. It is only natural that the private automobile should be used extensively under unfavorable conditions.

Recognition of the existence of serious competition has served to awaken the industry from the self-satisfied attitude which has been quite prevalent. It has been said that next in importance to doing the right thing is advertising that you have done the right thing. Earnest effort to improve railway service, it is believed, exists in every street railway organization, but this effort will not produce the desired results if achievements are not effectively placed before our customers. Railways have an article to sell; the sales organization exists. It must, however, be organized and it must be made to function.

High-powered salesmanship under able leadership is required in the transportation field to the same degree that it is required in any manufacturing field. No manufacturing company, no matter how efficient the

This is the issue in February that is devoted essentially to maintenance subjects

productive organization might be, would expand and grow without a highly-trained sales department. The railways have a product to sell which is in natural demand, and this demand can be capitalized only through effective salesmanship. Every employee who comes in contact with the public should be an enthusiastic member of this organized sales force. When this has been accomplished, the private automobile will be used to a lesser extent, particularly in crowded cities, street car riding will increase and net revenues will show decided improvement.

Substitution of Car Names for Numbers Presents a Problem for Master Mechanics

SEVERAL electric railways have recently adopted the practice of bestowing names on their passenger cars in place of the old-fashioned numerical designations. This change deserves careful consideration from two angles. Will it have a beneficial effect in popularizing the transportation service? Will it add to the problems of the master mechanic by complicating the classification of rolling stock?

From the transportation standpoint results have shown that there is a real advantage in using names on cars rather than numbers, according to several railway managers who have adopted the practice. Perhaps it has a tendency to personalize the service by giving each vehicle a definite individuality. Use of local names appeals to local pride. The mere novelty of the scheme has a certain appeal. In any event the public seems to take kindly to the use of car names.

From the standpoint of the master mechanic the change undoubtedly involves some difficulties. In this connection it is interesting to consider the practices of the Erie Railroad and the Pullman Company. For a number of years past it has been the custom of the Erie to place the name of the engineer on the cab of one locomotive of each division instead of the number. This special recognition is believed to improve the morale of the engine man. The locomotive, however, retains its original number and is known by this number in all the records of the mechanical department.

Identification of the rolling stock of the Pullman Company, which is known only by name, is a more difficult problem. Every car has a plan number in addition to the name. For example, the latest twelve-section drawing room sleeping cars are known as plan 3410. A descriptive list is printed periodically and distributed to the mechanical department, showing the names, plan numbers and types of brakes, couplers, trucks, electric fixtures, water and heating systems with which the cars are equipped. Information is also given as to the exterior design of the cars. In addition, all of the different terminals are furnished with very complete catalogs of parts, illustrated with photographs of each part. This facilitates the identification of the part and reduces the liability of wrong replacement parts being furnished.

Since the number of electric railway cars identified by names is likely to be comparatively small on any one property, the method used by the Erie seems to be the easier solution of the master mechanic's problem. It will be well worth while, however, to give due consideration to this question at the very beginning, because the difficulty of keeping track of the kind of parts required will increase rapidly as the number of names increases.

The Manufacture of Parts by Railways Is Often Poor Economy

HOW often the question has been asked as to whether or not operating companies have exceeded their proper field of effort in undertaking a large-scale manufacture of parts! Walking into the erstwhile maintenance shops of some railways one is struck with the feeling that he has by accident happened upon the plant of an equipment manufacturer. Shiny new parts are to be seen in every direction.

But—and of course there must be a but—it is well to consider just where this situation is leading. To say that circumstances never justify the manufacture of parts by operating companies would be absurd. But it would be equally foolish to cast discretion to the four winds and to enter upon a period of stubborn competition with the established manufacturers. Competition in itself, if limited to proper bounds, stimulates a healthy condition in any industry. However, care must be observed in steering clear of what may at first glance appear to be a means of effecting real savings in manufacturing costs, but which may later manifest itself in its true colors as a costly anomaly.

Were it possible for individual companies to take upon themselves the task of manufacturing all of the widely diversified products needed in their operations and to carry out this task quite as cheaply and as effectively as the regular manufacturers are able to do, then would the latter firms be hard put to it to defend their economic prerogatives. But under the existing order of things this is manifestly impossible. Each year the manufacturers spend vast sums of money in research and development programs. Since the cost of such work would be far beyond the reach of individual companies, the immense value of all this engineering endeavor would be lost to the industry.

Shop superintendents and purchasing agents of the various companies are frequently deluding themselves concerning the true economies to be effected by undertaking the production of new equipment and replacement parts. It is simply a matter of accurate bookkeeping. Instead of fairly apportioning the item of shop overhead between maintenance and new parts manufacture, they have placed the entire burden upon the former. This has resulted in an absurdly small apparent cost for manufactured parts, as shown on the books.

Right Materials Essential for Armature Repairs

SO MUCH depends on the perfect functioning of a railway motor armature that it is essential to keep it in as good operating condition as possible. The modern armature is a rugged piece of apparatus, even though the wires, commutator bars and insulation are relatively delicate. Motor manufacturers go to great pains to build armatures correctly. They have done a great deal of development work covering a long period of years, and have profited greatly by study of the service records of many armatures.

Since even the best of armatures will fail in time, it is necessary to repair them so that they will once more do their work as at first. In practice, however, many railways do not put them back into their original condition. Frequently other materials are employed and

other methods of winding are resorted to than those developed by the manufacturer. While some of these substitute practices are excellent, in general it may be stated that they cannot produce results better than the original.

An article by Jesse M. Zimmerman in this issue, which gives in detail the practice of one manufacturer, is well worth the attention of the master mechanic and armature foreman. While the practice of other manufacturers may differ somewhat in detail the general principles are the same. Close adherence to such methods should result in far less failures than are common on some roads.

Hope Springs Eternal in New York City

MAYOR WALKER of New York hopes to negotiate a city-wide bus franchise with a 5-cent fare clause, it is said. Such optimism is truly remarkable. Few of the forty-odd applicants for franchises have offered to carry passengers for 5 cents, and it may be doubted if those who have offered could actually carry out any such plan. Only a short time has elapsed since the Tompkins Bus Corporation on Staten Island found that it could not operate profitably on a 5-cent fare and increased its rate to 10 cents. Operating conditions on Manhattan Island are more difficult than on Staten Island. Due to the prevailing traffic congestion the speed would necessarily be slow and the cost of operation correspondingly high. In recent years many trucking concerns in New York have substituted horse-drawn vehicles for motor trucks to cut down the expense of time wasted in traffic jams.

It is said that one of the chief advantages of a city-wide franchise would be that the operator would take the lean lines along with the fat ones. At a 5-cent fare, however, it's a safe guess that most of the lines would be lean.

A Good Name Cannot Be Measured in Dollars

PUBLIC relations men have for years been preaching the value of square dealing with the officials and residents in a community served. They point out that consistent adoption of this policy has a lasting value. But it is not so often that they have the opportunity to point to tangible results that show just how much influence such a policy has on a utility.

Seldom has there been an expression of opinion so favorable to a utility and its management as that given J. N. Shannahan and his associates on the occasion of their sale of the Newport News & Hampton Railway, Gas & Electric Company. The local newspapers have gone to great length to express editorially the sentiment of the people in the community. "The company has never attempted to dicker with the municipal bodies of this section," says the Newport News *Times-Herald.* "To the contrary, it has treated those bodies with consideration, has kept no secrets from them, has laid its case in frankness and confidence before them whenever any emergency in its affairs has arisen. . . . In short, the company has made itself part and parcel of the community and has heartily co-operated with the people in all movements and enterprises for the common good. It has been a good and helpful partner and has rendered service in many directions outside of its immediate sphere of activities."

While praising the work of the company, the same newspaper points out particularly Mr. Shannahan's leading part in it. The Newsport News *Press* goes even farther, saying, "It is not in disparagement of the other officers to say that this is due primarily to the integrity and the fidelity of President Shannahan. He is an upright man and a loyal citizen. He has dealt with the community not in selfishness but in the spirit of fairness and generosity."

Such praise is praise indeed. But the value of this mode of conduct is not overlooked by the *Press.* "His indorsement of any enterprise is sufficient to inspire the confidence of investors." That is the acid test. The results that have been obtained by Mr. Shannahan show that his methods should be studied by other operators.

Maintaining Axle Bearings of Paramount Importance

HEAT generators is the name given to bearings by one workman. This is true. The object of the manufacturer is to design the bearing to generate as little heat as possible, and that of the maintenance man to keep it running on a low production basis—as to its byproduct, heat.

Attention is again called to the information on bearing practice developed at the January meeting of the Metropolitan Section of the American Electric Railway Association. The papers, which were abstracted in this paper, issue of Jan. 16, showed that more attention should be given to the subject of bearing wear and replacement. The range in wear over a given period by different roads under quite similar conditions shows that much can be done by the average road to get less wear.

Oiling is also important. A sufficient flow to keep the bearings lubricated is an essential that never should be overlooked. Too many operators save oil at the expense of bearing metal, with the result of poor performance. The work of packing bearings is so important that good men should always be assigned to it and they should be given the best of instruction.

Perhaps the bearings most difficult to maintain are those supporting the driving motors on the car axles. Necessarily these must be split to allow easy removal of the motors. They receive a maximum of thrust from side to side as the axles are moved, due to track imperfections or curves and special work, as well as due to the shifting of the motor itself from side to side. The weight is also unsprung.

An article published in this issue shows the bad effects of excess bearing clearance on the meshing of gears. Even a slight increase in the distance between centers throws the gears out of alignment and causes excessive wear. When the bearings are worn so that the centers are $\frac{1}{4}$ in. too great, as happens frequently, conditions are far more serious.

Despite all these difficulties and opportunities for undue wear it is these bearings that determine the life of gears and pinions and the incumbent noise arising from their operation if gear centers become spread due to wear in the bearings. Care should be taken of all bearings, their lubrication and maintenance as well, but particular care should be given to the axle bearings if low gear and pinion cost is desired.

Rail Bond Maintenance

Several Types of Bonds Have Been Tried in the Electrified Sections of the Chicago, Milwaukee & St. Paul Railway—The Maintenance Methods and Organization Used Are Described

By Charles G. Lovell
Assistant Engineer, Electrification Department,
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WHEN plans for the electrification of the mountain divisions of the Chicago, Milwaukee & St. Paul Railway were prepared, it was decided to use a bond with an expanded terminal, expansion being secured by means of a tapered pin driven through the hollow terminal of the bond. This type of bond had been in use on a number of important roads and at that time was probably the preferred form of rail bond for steam railroad electrification. The consideration which was felt particularly important in selecting this type of bond was that it provided a bond which the section crews could install readily, as most of the tools required would already be normally in their possession.

All bonds were single conductor, 250,000 circ.mil capacity, made up of 61 wires. The terminals were $\frac{7}{8}$ in. in diameter and $1\frac{1}{8}$ in. long under the head. The hole through the terminal was 0.406 in. and was expanded with a $\frac{1}{2}$-in. diameter steel pin. The bonds were installed in rails of 85 and 90 lb. standard sections on the main line, and on miscellaneous rails from 56 lb. to 85 lb. on the side tracks. In general, 100 per cent, Bonzano, angle and Weber joints are found on the 90-lb. rail; continuous and angle joints on the 85-lb. rail; and angle joints on the smaller rails.

Three forms of bonds were used, depending on the nature of the rail and joints. Where space under the splice bar was sufficient, and conditions permitted the removal of the bar, a concealed bond was used. This bond was provided with a crimp between the middle bolts to provide for expansion and flexibility. Where there was sufficient space under the splice bar, but it was undesirable to remove the bar, a bond with one welded and one detached terminal was used. One joint bolt was removed to allow the passage of the crimp, and the bond was pushed into place under the bar. The loose terminal was then soldered on and applied to the rail in the usual manner. On the remaining rails exposed bonds were used enough longer than the splice bars to provide the necessary clearance and to permit stapling the bonds to the ties.

Double Bonding Used for Large Currents

Exposed bonds were installed on the inside face of the rail, as this position appeared to result in less damage to bonds in cases of derailment. Where the contemplated current per rail was more than the carrying capacity of one bond of the standard size, double bonding (i.e., two bonds per joint) was used. In exposed bonding, one bond was identical with those used in single bonding and the second was enough longer to extend beyond the terminals of the first. When concealed and semi-concealed bonds were used, the two bonds were identical but on opposite sides of the rail. Both rails of the main line were bonded. On side tracks one rail only was bonded, but provision was always made for two connections of such tracks to the return circuit.

The concealed and semi-concealed bonds had extended lengths of approximately 20 in. and 38 in., respectively. The single exposed bond was, in general, 37 in. in length, and the second bond in double bonding was 42 in. On account of some of the angle bars on the lighter rails being six-bolt bars, special bonds of longer lengths were occasionally required

Since the contact resistance of this type of bond depends on the conditions of the contact surfaces and on the pressure obtained between surfaces, the care with which the bonds were applied was very important. Carefully prepared instructions were furnished to both the installation forces and to the operating forces that were required to take care of bond replacements. It was required that the terminals be cleaned with fine emery cloth and the hole in the rail wiped out with a piece of clean, dry cheesecloth immediately before the bond was applied. No lubricant was allowed on the drill bits. To make certain that a good fit was obtained, a plug gage was provided and all holes gaged. If holes were accidentally drilled oversize, the bonds were installed with an oversize pin. However, great care was used in regrinding the bits so as to guarantee holes of proper diameter. Careful supervision of all parts of the installation work was found very desirable.

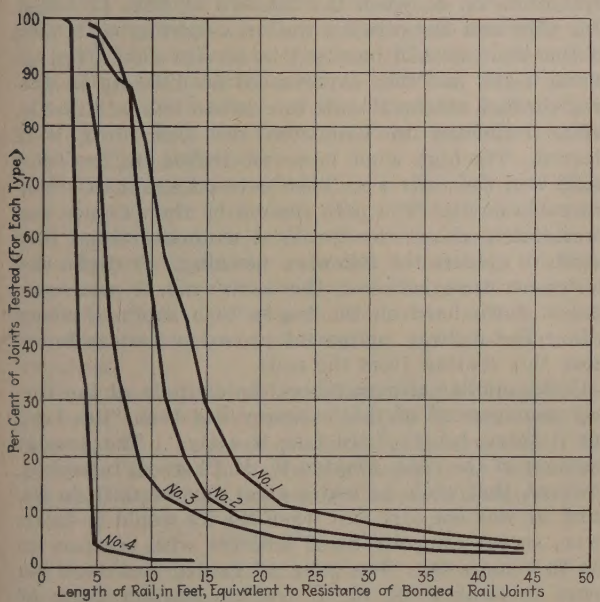
Some Special Equipment Used for Drilling

For drilling the holes for the application of the bonds, hand-operated drills were used throughout on the first two divisions electrified. On the Coast division, however, a very large proportion of the work was drilled by air-driven drills, the power being supplied from an Ingersoll-Rand air compressor. A special drill carriage was made up to hold, guide, and feed an air drill. The use of this equipment accomplished a very decided saving in the cost of application of the bonds and was used with good success. It was only when the necessity for rushing the work required establishing additional bonding crews and compressors were not available that hand drills were used on this division. The saving secured by the use of the compressor is reflected in the cost of applying bonds by the two methods, the cost per bond, using hand drills, being about 49 cents as compared with a cost of about 31 cents for bonds applied where the holes were drilled with air. These are direct labor costs only (including foreman and all men in crew) with a laborer's rate of 53 cents. Adding other labor charges such as repairing equipment, moving, etc., the above figures should be increased by 13 cents, and to this must be added tools, equipment, camps, transportation, etc.

When one compressor was being used the crew usually consisted of one foreman, two drillers, two gas-

engine men, eleven helpers, and one camp helper. The cost when applying concealed bonds was about double the above.

After the initial installation was completed by the electrification department, the roadway forces and the signal department were made jointly responsible for the maintenance of the bonds. Section crews were to replace bonds where rails were renewed, but the signal maintainer was to be notified in each case so that he could inspect the work. Full instructions in regard to installing the bonds were incorporated in the special instructions which were issued covering the electrical operation. These instructions were placed in the hands of all section foremen, as well as all other employees having to do with electrical operation. The instructions covering the installation of bonds were substantially full specifications for maintenance and renewals.



Resistance of Bonded Rail Joints—Missoula Division

Special tests were made to determine electrical resistance on 2,725 rail joints, as follows:

Curve No.	Type of Bonds	No. Joints	Bonds per Joint	Weight of Rail
1	Pin type	1,143	1	85 lb.
2	Pin type	515	1	90 lb.
3	Pin type	809	2	90 lb.
4	Welded	258	1	85 and 90 lb.

All measurements made between points 30 in. apart.

Curves show for various rail lengths, percentage of rail joints with resistance equal to, or greater than, such lengths.

Where new rail was laid or other causes required the bonds being replaced, new bonds, drawn from the storeroom, were used in every case, the bonds removed being sent to the state department for re-forming. At first these used bonds were merely inspected and strands straightened, and when again replaced in rails, special oversize pins were used. The amount of oversize of these pins was considerably more than that of the pins classed as oversize and used, where necessary, in the application of the new bonds. A method was later developed whereby the terminals of the second-hand bonds were reshaped so as to bring the tubular portion of the bond back to its original length, and inside and outside diameters. These bonds were then handled in the same manner as new bonds. A very appreciable saving in the cost of replacing bonds was secured by this practice of recovering used bonds.

This method of repairing the bonds overcame several serious objections to the use of second-hand bonds. Previously, considerable confusion had arisen through the necessity of using various sizes of pins, extra oversized pins being used in new bonds or the small oversized pins in used bonds. Even after being applied with the proper oversize pins, poor contact was secured in many cases, as the original shape of the terminal had been changed by the process of application and removal, although a tool had been especially designed for removing the terminals. It is, of course, very costly to scrap the bond when replacement is necessary. To scrap a 37-in. bond and apply a new one involved a net expenditure for material of about $1.15, whereas the cost of repairing was only 70 cents.

In addition to the inspection which was expected from track forces and signal maintainers, a bond repair crew goes over all the trackage, inspects the bonds and replaces those found defective. The latter are usually bonds which had been installed by the section crews in connection with rail replacements. The personnel of these crews is subject to rather frequent replacement and it is difficult to make even the older men appreciate that more than a mere tight connection between rail and bond is necessary. Our experience with the installation of bonds by section crews is, therefore, rather unsatisfactory.

Meanwhile, the gas weld bond had been developed to such an extent in interurban and similar service that we decided to determine its suitability for our own trunk-line conditions. Its attractive features were its relative cheapness, more reliable and permanent bond and rail contact, assuming proper installation, and greater ease of inspection.

Conditions Met by Gas-Weld Bond

Our problem was, mainly, to determine: First, whether the welding would have any deleterious effect on the steel of the rail; second, whether bond maintenance and replacements could be handled without ultimate uneconomical increase in existing maintenance forces, and third, whether the bond itself would stand up under the actual service conditions.

In order to determine the effect on the steel of welding the bond to the rail, the railway company had microscopical and chemical examinations of the steel made by a competent testing laboratory after a bond had been applied. The observations indicated that no serious injury was done to the rail as a whole. The experience of other companies was also studied, and the conclusion reached was that the welded bond could be tried safely.

In changing to this type of bond it was not possible to have the application made by the section forces and, therefore, it was arranged that the signal maintainers should be supplied with welding equipment and do the welding work. This arrangement has worked out very satisfactorily. The men have learned the operation of welding quickly and they are supplied with small tanks of welding gas, which may be carried easily on the gas cars commonly used by signal maintainers. The signal department is thus placed in charge of all bonding and bond maintenance, whether or not the bonds are on rails involving signal circuits. This removes an undesirable condition previously existing wherein the signal maintenance forces were responsible for the condition of the bonds without having direct supervision over the forces which applied the bonds. In addition to the bond maintenance work done by the signal maintainers who have

fixed headquarters, there are the bond testing crews previously mentioned that move from place to place and whose duty it is to make a routine test of all bonded joints and replace defective bonds. These crews are used also wherever there is extensive rail relaying work and the application of a number of bonds is required.

Saving Results from Use of Gas-Weld Bonds

The cost of applying the bonds varies, of course, with the conditions under which they are applied. Taking, however, for the sake of comparison, a condition where a number of bonds are to be applied in rail re-laying work it is found that the cost of the gas-weld bond is for the bond, gas, etc., about 70 cents, and for labor 38 cents, or $1.08 per bond. The cost of the 37-in. pin-type bond would be for materials $1.50 and for labor $0.45, or a total of $1.95. Thus a saving of about 87 cents per bond is realized. This saving is increased in territories where double bonding is used with the long bond, since a single bond only is required when the shorter bonds are used. This fact was determined by calculations of the relative heat conducting capacity of two types of installations, the favorable results of which were afterward confirmed by actual trial.

The welded bond, when properly applied, has a low contact resistance and this resistance does not increase with age. A defective application is usually more readily detected than with a pin-type bond, although we have had some cases where the steel sleeve of the bond was welded to the rail, but the strand was not, so that, although the bond appeared all right, the resistance was high, since the sleeve is not, in manufacture, welded to the strands. Such cases of defective welding appear to be very few and will decrease in number as the welders become more proficient.

Application of gas-weld bonds was started in 1921, since which year practically all new rail laid has been gas-weld bonded and a large part of the maintenance work, particularly in the past two years, has been done with this bond. A No. 0000 bond, 7 in. long, with pressed steel terminals is used, formed U-shape and welded to the ball of the rail.

Tests Show Results Accomplished

The experience to date with it has been very favorable, and unless there are objections not yet apparent the use of this bond will be continued. It has not been in use long enough yet to determine fully to what extent breakage of strands will be experienced or to be sure what the ultimate effect of welding will be on the rails, but these points were taken into consideration before the use of the welding process was begun, and it is not expected that sufficient trouble will be experienced from these causes to overcome the advantages of this type of bond.

In conclusion, it may be interesting to give the results of a special investigation which was made in 1924 of the bonding conditions on a considerable portion of our older electrified line. Over 3,000 bonds were tested at points so selected as to indicate the average condition of the bonds. Measurements were made by using two voltmeters, one indicating the drop in the bond and the other the drop in a fixed length of rail. The result of this study is shown on the accompanying curve, which shows the percentage of bonds with conductance less than the conductance of the stated rail lengths. The original pin bond installation, much of which still exists, was made in 1914 and 1915. The gas-weld bonds have, as already stated, all been installed within recent years.

Hot Brine Clears Car Tracks Quickly

Motorists Unconsciously Aid Snow Removal Along Lines of the Cumberland Traction Company—Tracks Cleared in One-Third Time Otherwise Needed

COLD dry snow to a depth of 14 in. covered the tracks of the Cumberland Traction Company, Bridgeton, N. J., when the blizzard of Feb. 11 ended. One plow and one sweeper, the snow-fighting equipment of this railway, had been put in service soon after the storm began and they experienced no difficulty in getting through on the 10-mile interurban line to Millville. After returning to Bridgeton the local lines were cleared. The high wind, however, drifted the dry snow badly and the rails were soon covered again to a considerable depth. The path cleared by the sweeper was immediately chosen by the local motorists when they began to operate the following morning. A slight rise in temperature softened the snow and it was soon packed down hard on the tracks to a depth of about 4 in. The railway equipment proved powerless to remove this coating from the rails.

Under similar circumstances the attitude of the former management of this company had been "the Lord put it there, let the Lord take it away." The present manager of the road, Clayton W. McPherson, remarked, however, that while he had a great deal of faith in the Lord, he was not sure just when the ice would be taken away, so the company hired laborers with scrapers to try to remove it. One gang of twelve men took six hours to clear 3,900 ft. of track. Another gang of fifteen men at the Millville end of the line took nine hours to clear 4,800 ft. Salt was sprinkled both before and after cleaning.

Progress by this means was so slow that the manager decided that some more effective means must be employed. Motor trucks were borrowed from a local ice cream plant and filled with a boiling hot mixture of salt and water. This escaped onto the tracks through the vents provided to allow melted ice to run away. The first tank wagon was started late in the afternoon in the worst downtown section. Automobile traffic continued to follow the car tracks and churn up the salty mixture. In 30 minutes the steel rails were again visible. Soon the 14 miles of the company's route was open and the cars were running. It is believed by the management that at least another 24 hours would have been required to open the lines without the use of hot brine.

Previous to the application of the brine the men cleaning the track averaged about 31 ft. per man per hour. After this treatment had been applied it is conservatively estimated that progress was three times as fast. Altogether 23 loads of brine were used by three trucks. Each load consisted of approximately 400 gal. of water and 460 lb. of salt. The total cost of ice removal by this method was approximately $1,000.

Rewinding Railway Armatures

Descriptions, Functions and Location of Armature Rewinding Insulation, Core Insulation and Banding Material Will Help Repairman to Do a Better Job

By Jesse M. Zimmerman
Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

EACH piece of insulation used in rewinding armatures for railway motors has a definite function to perform and accurate location is important. Insufficient insulation at some points may result in short circuits or grounds, while too much may cause the coils to build high and make winding difficult. Information regarding the material used in winding the Westinghouse type 306 railway armature has been gathered and is given to help the repairman who rewinds this and similar type armatures.

Material used for rewinding is divided into three groups, (1) core insulation, (2) winding insulation and (3) banding material. When making minor repairs on an armature, it may be necessary to use only the banding material. In rewinding an armature sometimes it is unnecessary to use the core insulation, so that the rewinding insulation and banding material only are required.

In order to present the information so that the repairman can see its proper location in the winding a diagram and halftone are used as illustrations. The numbers for the parts in the illustrations will enable the reader to follow the description more intelligently.

Core Insulation

Item 1.—Ninety-six tan-treated* cloth caps, 0.010 in. thick cut in 8 sections from a circular piece, 12 in. inside diameter and 18½ in. outside diameter. Each section has four fingers cut 1½ in. deep from the center. These caps are placed against the end bell in three layers; each layer is four strips deep. They are held against the end bell by tan tape, Item 2, which is used to cover the coil supports. On high-voltage motors micarta molded strips are used to cover the coil supports and end bell.

Item 2.—Three rolls of tan-treated cloth tape, bias cut. This tape is used to cover the coil supports and holds the tan-treated cloth caps.

Winding Insulation

Item 3—Fifty-eight fishpaper U-pieces, 0.056 in. x 3½ in. x $\frac{5}{16}$ in. grooves are provided in both ends of the slot in the armature core for fishpaper U-pieces. These U-pieces protect the ends of the coils where they leave the slot.

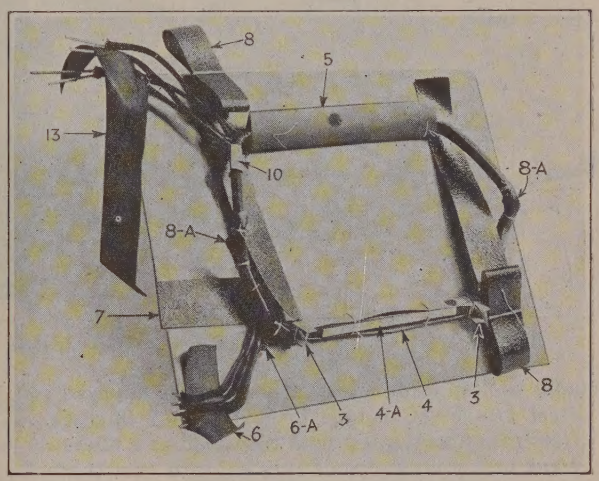
Item 4.—Twenty-nine fishpaper cells for bottom coil, 0.023 in. x 2 in. x 10 in. Separate cells are used for the coils in the bottom of the slot. This cell is placed over the coil and driven into the slot with the coil.

Item 4-A.—Twenty-nine fullerboard pieces between top and bottom of coils, 0.030 in. x ½ in. x 6 in. This strip separates the top and bottom coils in each slot.

*This is a trade name for tan-colored, oil-treated linen or other cloth.

Item 5.—Twenty-nine fishpaper cells for top coils, 0.023 in. x 4½ in. x 10 in. This cell is large enough so that it extends above the laminations. A separate cell is used for the top coil so that if the top coil has to be repaired it can be done without disturbing the insulation of the bottom coil. When the top coil is replaced a new cell is used.

Item 6.—One strip of treated surgical tape, 0.023 in. x 2 in. x 42 in. This tape is woven between the bottom leads back of the commutator neck. It keeps the leads separated at this point.



Materials Used to Insulate Armature Coils

Item 6-A.—Twenty-nine strips of treated oil duck, 0.035 in. x 1 in. x ¾ in. This strip is placed over No. 2 and 4 leads where they leave the front bottom corner of the coil. Leads Nos. 1 and 3 will lay on top of this strip. This separates the leads where they leave the coil, thus preventing the leads from shorting at this point because the leads form a double layer.

Item 7.—Twenty-nine strips of treated oil duck, tapered, 0.035 in. x 2 in. x 4½ in. short side, 6 in. long side. These strips are placed between the lower leads and the bottom half of the front diamond part of the adjacent coil. The tapered end is anchored and brought up between the bottom half of the two front diamond parts of adjacent coils. After the coils are laid and the bottom leads connected the ends of these strips are brought around the extreme end of the diamond and fastened with friction tape. This strip protects the bottom leads from the bottom of the adjacent coil besides separating the coils where they make the bend at this point.

Item 8.—Two strips of treated oil duck, 0.035 in. x 1¾ in. x 42 in. These strips are placed between the top and bottom halves of the diamond parts of the coil, for the front and rear of the armature. They serve to separate the top half of the diamond part of the coil where it crosses the bottom half of the diamond part of the lower coil, which is running in the opposite direction and is of a different potential.

Item 8-A.—Fifty-eight treated duck pieces, 0.035 in. x 2 in. x 3 in. These strips are placed over the drop loop of the diamond, both front and rear, where the top half crosses the bottom half of the preceding coil. It serves as a separator where the insulation is most apt to be damaged in winding.

Item 9.—This is a fiber wedge which fits over the coil in the armature slot.

Item 10.—Twenty-nine strips of fishpaper, 0.015 in. x 1½ in. x 1¾ in. These strips are bent to an L shape so that they will fit between the top halves of the front diamond parts of two adjacent coils. This strip insulates the top leads where they cross the adjacent coil.

Item 11.—Friction tape to hold Item 7 in place.

Item 12.—Tan-treated cloth tape used as a filler.

Item 13.—Four strips of surgical tape (not treated), 2 in. wide x 0.020 in. This strip of surgical braid is woven alternately between Nos. 2 and 4 leads of each coil, as these leads are connected first, after which it is then wound once over the top of these leads next to the commutator, then woven alternately between leads 1 and 3 of each coil. This separates adjacent leads at the top with two layers of surgical braid. This is essential because the cotton insulation is scraped from the leads when they are tinned. It must be wound tight so that it will keep the leads firm. Some types of motors have the leads taped with friction tape.

Banding Material

Item 14.—One-half pound of tan-treated cloth tape. This tape is used to cover the top leads. It must be wound tight so that it will hold the leads firmly, as vibration of the leads at this point may result in broken leads.

At this point of the winding the armature must be heated to 100 deg. C. and banded with temporary bands while it is hot, thus drawing the coils down firmly.

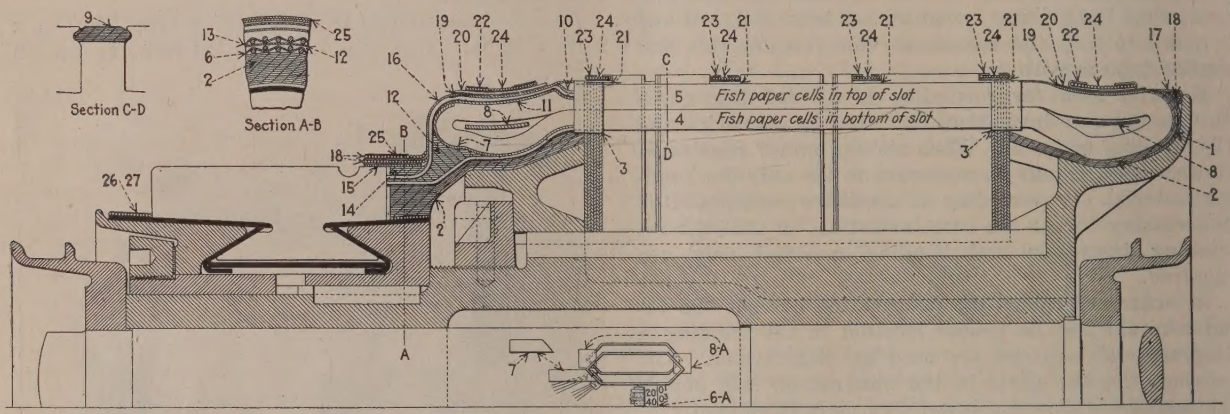
Item 15.—Seven strips of mica, 0.008 in. x 1 in. x 6 in. These strips are placed over the commutator neck to prevent the solder from flying out of the slots in case it melts. It is held in place by Items 16 and 18.

Item 16.—No. 49 drilling hood is placed over the mica strips which cover the commutator neck and is held in place by a layer of No. 12 thread, which is wound tight around the armature at this point and is painted with an air-drying varnish. It is then doubled back over the first layer of No. 12 machine thread. It is covered by a second layer, wound tight on the thread. This layer of thread should cover the drilling hood to the point where the leads bend up to go over the ends of the coil. The top lap of the coil is sewed.

Item 17.—One drilling hood, 0.017 in. x 9 in. x 48 in. The tan-treated caps (Item 1) are laid over against the ends of the coil and the one edge of the hood is firmly anchored by a tight woven band of No. 12 machine thread. The hood is doubled back over the coils.

Item 18.—Two hundred and fifty yards of No. 12 machine thread.

Item 19.—Two strips of fishpaper and mica, 0.012 in x 2 in. x 96 in. After the temporary band, which was used to draw the ends of the coils down, is removed, the drilling hood is drawn tighly over the coils. One strip of fishpaper and mica is placed around the hood.



Types of Material Used for Rewinding Armatures

Item 20.—Two layers of surgical tape, 0.020 in. x 2 in. x 4 in. A strip of surgical braid covers the fishpaper and mica strip. This braid is covered with a tight layer of No. 14 banding wire (Item 24), with twelve tin clips (Item 22) placed under the banding wire, the ends being bent over and soldered to the banding wire. The above outlined operations covering Items 19, 20, 22 and 24 are identical for banding over the front and rear coil support. The two outer core bands are used to anchor the ends of the front and rear drilling hood.

Item 21—Four strips of sheet tin, 0.012 in. x ⅜ in. x 48 in. These strips of sheet tin are placed over the coils in the banding slot on which to wrap the banding wire (Item 24).

Items 22 and 23.—Tin clips. These tin clips are placed under the bands, bent over and soldered to the wire to keep the banding wire intact.

Item 24.—Wire used for banding.

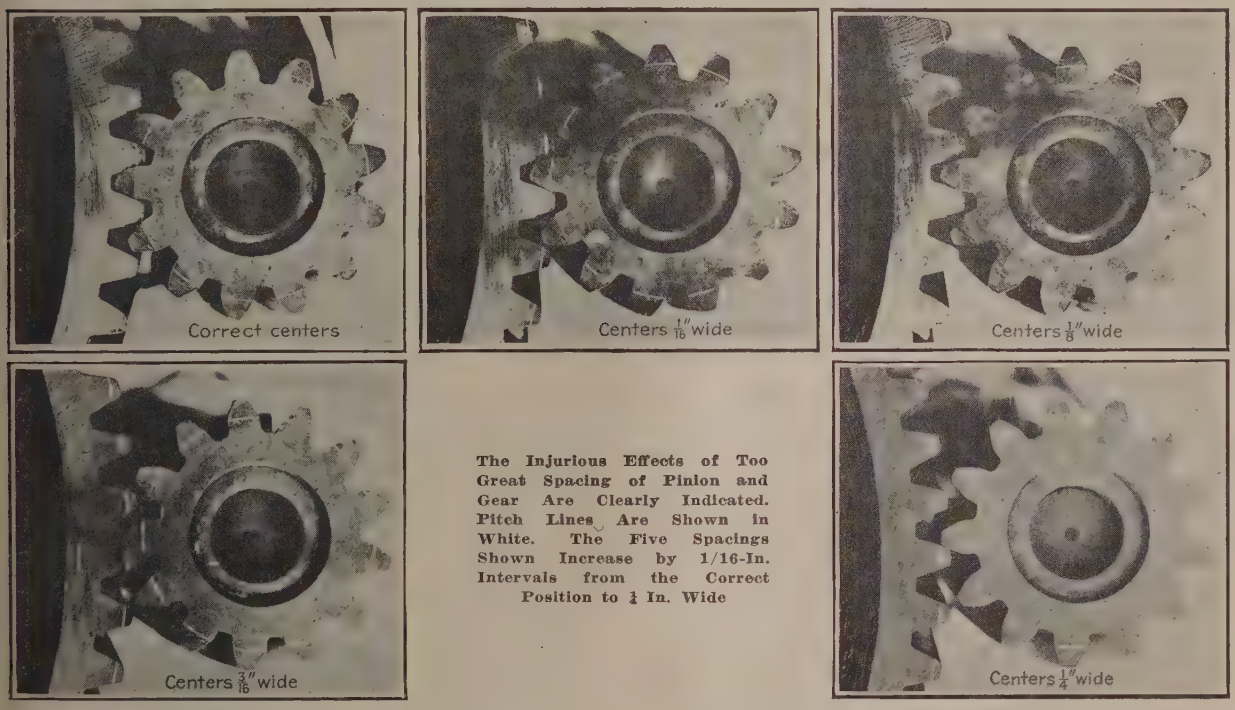
Item 25—Two layers of surgical braid wrapped tight and sewed in three places serve as a protection to the No. 12 machine thread (Item 18) against flashes.

Items 26 and 27.—Italian twine. One layer of four-ply Italian twine, saturated first with No. 3 and then No. 4 shellac and well ironed with a hot soldering iron after each application of shellac, makes an oil and moisture proof V-ring protection upon which a minimum amount of dust will adhere.

Excessive Gear Spacing Causes Trouble

Model Shows How Noise and Wear and Breakage of Teeth Follow Rapidly with Increases in Distance Between Centers of Gear and Pinion

DURING the early days of electric railroading great efforts were made by motor manufacturers to design a motor whose armature could be mounted directly on the car axle. The purpose was to dispense with gearing, which in those days was a source of great expense as well as noise in car operation. These efforts to design a gearless motor have been given up, at least so far as car operation is concerned. It was found that the gearless motor has many serious objections, and as gear manufacturers have improved their product most of the defects experienced with the earlier gears and pinions have disappeared. If properly run and protected from damage, the modern gear and pinion should have a long life and give very little trouble. If their operation is not properly supervised, however, the life which they should have is greatly shortened, and they are responsible for a great deal of the noise which comes from car operation. In other ways, also, they will not give the maximum performance of which they are capable.



The Injurious Effects of Too Great Spacing of Pinion and Gear Are Clearly Indicated. Pitch Lines Are Shown in White. The Five Spacings Shown Increase by 1/16-In. Intervals from the Correct Position to ¼ In. Wide

The principal trouble from gears of proper shape and material and properly lubricated comes from too great spacing between the gear and pinion. As the armature and motor axle bearings wear, the spacing between the pinion center and gear center tends to become greater. In consequence, the teeth of the gear and pinion, instead of touching at the pitch line, come in contact only at the outer ends of the teeth, with resulting greater wear and noise from the backlash.

The wear of the armature bearings and motor axle bearings which causes this spread of the gear and pinion can take place both in the bore of the bearing and on the outside of the bearing where it is held in the housing. Some wear is also possible on the inside of the motor housing, caused by a loose fit of the dowel pins or keys used to prevent the bearing from turning. There is also possible wear between the motor housing and the motor frame. It naturally follows that the distance of the spreading apart of gear and pinion is the sum of all the loose fits mentioned.

The bad condition brought about by too great spacing between gear and pinion is clearly illustrated in the accompanying five illustrations. They are from a series of photographs made by the R. D. Nuttall Company of a new railway gear and pinion set at different spacings. To bring out the injurious effect of improper spacing the Railway Improvement Company constructed a model, made up of a new gear and pinion mounted on a pedestal so designed that the space between the centers of the gear and the pinion could be set at various lengths by exact graduations of ☆ in. This model was shown at the Atlantic City convention. The gearing illustrated has a 13:74 ratio and a 4¼ pitch. The pitch line is shown by a white line marked on each tooth.

The first illustration shows the gear and pinion at the correct distance apart. In this position, as will be seen, the teeth engage at the pitch line. With this condition the white marks on the teeth of the gear and pinion in engagement make a practically continuous line.

The next view shows the centers of the gear and pinion 1/16 in. farther apart, and in the third view the centers are another 1/16 in. apart, or at a distance 1/8 in. greater than in the first view. Already the teeth are shown to be beginning to engage at their outer ends only. This condition is still more marked, of course, in the fourth and fifth views, which shows the centers 3/16 in. and 1/4 in. farther apart respectively than in the first view. The engravings are about one-half actual size. In consequence, the spacing between teeth and gear centers are correspondingly reduced in the engravings over that in actual practice.

It is obvious from the view of the 1/16-in. wide centers that the teeth are engaging on only a very small portion of their wearing surfaces, and that if operations under these conditions are continued for any considerable length of time the natural result would be for the teeth to lose their original shape. It is also clear that all of this wear is coming at the ends of the teeth and that only one tooth on the gear and one on the pinion are in contact for any considerable part of the time, whereas in the view of the correct spacing two sets of teeth are in engagement for most of the time.

A condition like that in a 1/16-in. wide spacing will not continue long until the teeth will begin to lose their proper shape and it will be necessary to discard them. There will also be a great increase in noise, especially as the car speed changes during a run, as there is a great deal of backlash to take up when a change in the speed of the car makes the change from engaging on the front of the teeth to engaging on the back of the teeth, or when the direction of rotation of the motor is changed. There is danger also, under such conditions, that the teeth of gear or pinion or both will become broken because of the great impact between teeth combined with a small area of bearing surface.

Clearly, the correct way of gear operation is when the gear and pinion mesh as shown in the first illustration. This condition should be approximated as closely as possible by keeping the tolerance allowed for the fit of the bearing on its shaft as small as possible. This condition can be maintained only by measurement of the wear in the bearings and associated parts at more or less frequent intervals, depending upon their wearing qualities and the quality of lubrication supplied to them. A slight increase in the distance between centers may not seriously affect the proper shape of the gear teeth, but it is doubtful whether the allowance of 1/16 in. permitted under the rules of the American Electric Railway Engineering Association is not too great. The London Underground Railway is said to work to 3/32 in. clearance.

Clearances between shafts and bearings should not only be kept very small, but constant attention should be given to keeping bearings tight in their housings and housings tight in motor frames. Omission of this precaution, as already stated, permits spreading of gear and pinion centers.

When new bearings are installed, the caps should be pulled up tight and steel feelers applied between the cap and the brass to see that the bearings actually are tight. Still another way of determining whether they are tight is to apply the air brake, then turn the controller to the first notch for a moment. If the brasses move they are not tight.

Present-day practice seems to be not to give as much attention to the axle bearings as to the armature bearings, so conditions at the axle bearing fits are more likely to be neglected. Nevertheless, axle bearings are subject to greater wear than armature bearings because there are no springs between the axle bearings and the track and the pounding they get is harder. Moreover water from the street is much more likely to get into the axle bearings than into the armature bearings. Still another point, and one of great importance, is that in the axle bearings the openings or windows for waste usually are larger in proportion to the surface of the bearings than they are in the armature bearings. Here are a number of very good reasons for very careful watching of axle bearings in motor inspection.

The destructive results of too great a spread and loose brasses are so insidious that it would be desirable on any property where the conditions are not positively known to have a check made right away. Even where it is thought the conditions are good, a check test may be worth while. As an example of how much wear sometimes comes, measurements will be quoted of wear observed on four axle bearings recently taken from a 40-hp. motor used in city service. The following amounts of wear were found:

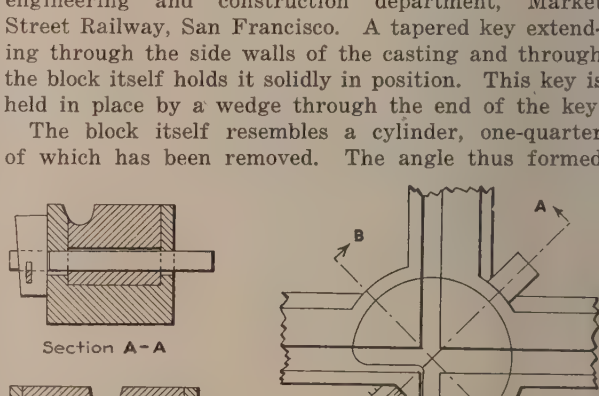
Flange Wear	Wear in Bore
One bearing, 1/2 in. wear	One bearing, 1/2 in. wear
One bearing, 1/4 in. wear	One bearing, 3/8 in. wear
One bearing, 1/16 in. wear	One bearing, 3/8 in. wear
One bearing, 1/16 in. wear	One bearing, 1/4 in. wear

The figures given above are of wear only in the axle bearings. If to this wear is added that in the armature bearings and in the housings, the particular motor mentioned must have had considerable spread.

Crossing Insert Shaped to Hold Position

AN ANGLE-SHAPED hard center insert for crossing frogs has recently been designed by J. H. Asselin, engineering and construction department, Market Street Railway, San Francisco. A tapered key extending through the side walls of the casting and through the block itself holds it solidly in position. This key is held in place by a wedge through the end of the key.

The block itself resembles a cylinder, one-quarter of which has been removed. The angle thus formed



Plan and Elevation of Angle-Block Crossing Insert

fits into the inside angle of the intersection, where there is no wear. Due to this right angle, it is impossible for the block to shift. The alignment is thus kept true at all times and the block cannot rise or buckle.

The angle block has the thickness of approximately two-thirds of the depth of the casting. The block is cast-steel and specially heat-treated to resist shock. When worn down this block can either be built up by welding or the block itself can be removed. If desired both the crossing and block can be made of manganese

Safety Zone with Raised Platform Recently Installed in Terre Haute

Substantial Safety Zones Constructed in Terre Haute

Curved Concrete Guards Reinforced with Old Rails Afford Protection to Waiting Passengers—Cast-Iron Buttons Fastened to the Pavement Mark Limits of Zone

By D. H. Walker
Assistant Engineer Terre Haute, Indianapolis & Eastern Traction Company

DURING the past year the Terre Haute, Indianapolis & Eastern Traction Company constructed several cheap but effective safety zones on Wabash Avenue, the main street of Terre Haute, and part of the National Old Trails Highway. This national road carries a heavy stream of cross-country tourists all the year around. In addition, the majority of the large retail stores in the downtown district are on Wabash Avenue and the vehicular congestion made safety zones necessary to protect people boarding street cars.

The first zone was installed as a raised platform at the corner of Wabash Avenue and Seventh Street, the busiest corner in town. As the street was 50 ft. wide between curbs there was approximately 18 ft. left from the rail to the curb. The platform was made 80 ft. long and 4 in. high above the brick pavement and 5 ft. wide, with its inside edge 18 in. from the rail. This provided enough length for unloading three Birney cars at once. A quarter circle concrete guard was placed at the end, and back of this guard was placed a concrete lamp base surmounted by an ordinary switch lamp with red lenses.

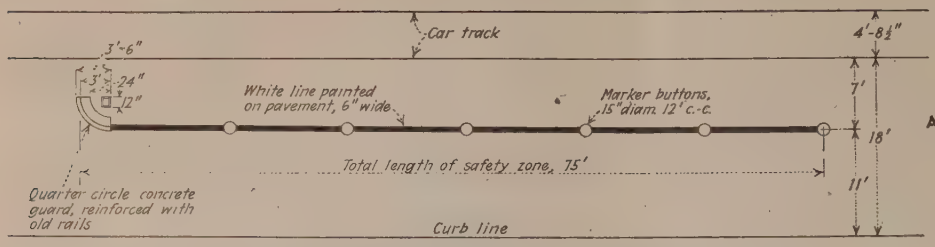
To prevent the guards at the ends of the zones being knocked over by a careless motorist, when the concrete was poured half a dozen old rails about 4 ft. long and extending down through the paving base were included for reinforcement. Guards were made 3 ft. high, 1 ft. thick, with a 3-ft. outside radius. In order to provide a hub guard the outside edge of the quarter circle was placed 6 in. inside the edge of the platform. The platform itself was poured directly on top of the brick paving, after taking out a zigzag row of bricks as a means of forming concrete lugs monolithic with the platform. A row of brick was removed at the inside edge of the platform toward the crown of the street to prevent seepage under the platform. To keep the concrete from chipping off an old three by three angle iron was used all the way around the edges and held by darts welded into the angle and extending diagonally down into the concrete.

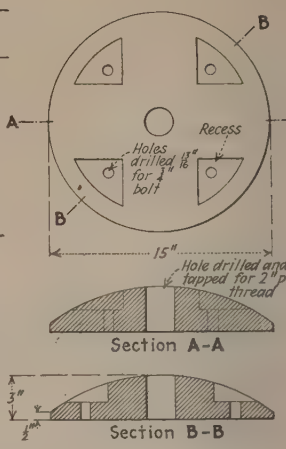
It soon was found that the quarter circle guard prevented accidents that even the raised platform could not have stopped. Accompanying illustrations show a few of the dents put in the guards by careless or inebriated motorists. Several arrests of drunken drivers have resulted from these attacks upon the zones, but up to date no one waiting in the zones has been injured and the guards themselves have suffered nothing worse than the chipping off of a little concrete.

After a few weeks trial of this first zone it was decided to install three more. These were not of the platform type, but had the zone line marked on the street with cast-iron buttons and white painted lines. However, the same safety feature was provided by quarter circle concrete guards as used with the platform. These isolated guards also had the 6-in. hub guard with an angle iron forming the edge. This angle iron was extended the whole circumference and was welded at the corners to prevent loosening. Darts welded to the angle and extending into the concrete also helped hold this.

Bricks were removed under the whole guard and concrete poured to the paving base. Reinforcing

Reinforced Concrete Guard at End of Safety Zone—Cast-Iron Buttons and White Lines on Pavement Mark Limits





Above, Arrangement and Location of Safety Zones with Relation to the Curb and Track. At Right, Cast-Iron Button Marker Used by Terre Haute, Indianapolis & Eastern Traction Company for Safety Zones

rails went through the paving base as before. On these later zones two were equipped with switch lamps and one was installed with a flashing safety zone warning as furnished by the American Gas Accumulator Company. The guards on all safety zones were painted with diagonal 6-in. stripes of alternate black and white.

In the use of buttons to outline these zones it was necessary to design a special type and have a pattern and castings made to order. The Board of Works and the city engineer thought that posts connected by a chain would be necessary. They were willing to try first without the chains, however, if provision were made to install them in case it was deemed necessary later. The company felt that the chains were undesirable and accordingly used a button as shown by the accompanying sketch. This was fastened with four ¾-in. bolts on the corners in recessed notches. Holes were drilled in the paving for these bolts and they were set in cement grout. A hole through the center of the button was drilled and tapped for 2-in. pipe thread in order that posts could be placed in these holes later. While in use without posts the holes were filled by pipe plugs, a countersunk plug being used to minimize danger of tripping on the buttons. After a thorough trial it was found that the posts and chains were not necessary as the quarter circle guard furnished all the protection needed against motorists with inclinations to ramble through the zones.

New York City's Greatest Traffic Points

SUBWAY stations of the Interborough Rapid Transit Company and the New York Rapid Transit Corporation (B.-M. T.) at Times Square, Manhattan, remain the greatest traffic points upon their respective systems and constitute New York City's greatest rapid transit center. This is the conclusion drawn from the Transit Commission's annual compilation of figures of ticket sales at various stations upon the rapid transit lines made public recently.

During the fiscal year ended June 30, last, the Interborough collected 39,493,384 fares at Times Square, while the ticket collections at the B.-M. T. stations were 26,064,283, a total of 65,557,667 fares collected. as against 60,388,549 in 1924, a growth during the year of more than 5,000,000.

The figures show that Times Square as a rapid transit traffic center is further ahead of Brooklyn Bridge than last year. The center shifted two years ago. Last year Times Square increased to approximately 7,000,000 ahead of Brooklyn Bridge, and this year it is approximately 11,000,000 ahead. The total at Times Square includes the fare collections, as has been stated, at the Interborough and B.-M. T. stations, while at Brooklyn Bridge the total embraces fare collections for the Bridge station of the Brooklyn elevated lines, the B.-M. T. terminal at Chambers Street and the Interborough's two City Hall elevated stations and Brooklyn Bridge subway station. At the Brooklyn Bridge center there were 53,983,558 passengers in 1925, as against 53,885,798 in 1924, a growth for this center of only about 97,000.

Another great center of rapid transit traffic is at Union Square, Manhattan. There is one station of the Interborough at Union Square and two B.-M. T. stations, one of them on the Fourteenth Street-Eastern line, which was first placed in operation on June 30, 1924. The Interborough at Union Square had a traffic of 20,508,136, or an increase of approximately 900,000 over 1924. The B.-M. T. traffic was 19,690,245, or an increase of approximately 1,500,000. The total traffic for the center was 40,198,381, or a growth for the year of more than 2,350,000.

At Grand Central station, which is the station of second importance on the Interborough lines, 37,234,126 nickels were paid, as against 35,864,163 in 1924, a growth of 1,369,963, a rate of increase somewhat less than in the year previous. The Pennsylvania station, the third in importance in the Interborough system, with 32,073,801, had a growth of 1,922,771, or slightly less than the rate of increase in the previous year.

Figures for important Interborough stations follow:

	1925	1924
Times Square	39,493,384	37,594,661
Grand Central	37,234,126	35,864,163
Pennsylvania Station	32,073,801	30,151,030
Fourteenth Street (East Side line)	20,508,136	19,636,487
Atlantic Avenue (Brooklyn)	16,952,648	16,703,450
Brooklyn Bridge	15,714,454	15,673,611
Fulton Street (East Side line)	14,157,961	14,010,247
Borough Hall (Brooklyn)	13,414,219	13,640,702
Fourteenth Street (West Side line)	12,419,299	12,304,865
86th Street (East Side line)	11,406,290	11,267,689

On the Interborough subway system the local station of heaviest traffic, that is, a station served only by local trains, is that at 50th Street and Broadway, where there were collected in 1925 9,902,832 fares, or an increase of a little less than 300,000 fares for the year.

The most important traffic stations of the B.-M. T. subway and elevated lines are indicated as follows:

	1925	1924
Times Square	26,064,283	22,793,888
34th Street	21,853,851	19,163,092
Union Square	19,960,245	18,195,263
Coney Island terminals (Brooklyn)	16,825,685	14,932,523
Essex Street	15,815,237	14,200,520
Chambers Street (Municipal Building)	15,336,469	15,212,858
Cortlandt Street	13,891,455	12,626,451
Brooklyn Bridge ("L")	12,970,766	12,840,666
De Kalb Avenue (Brooklyn)	11,971,464	12,141,732
23d Street	10,807,254	10,064,998

It will be noted that Essex Street passed Chambers Street during the year and Cortlandt Street passed Brooklyn Bridge.

Combination Locomotive-Car Developed in Switzerland

Twelve-Wheel Vehicle Consists of a Six-Wheel Passenger Coach Permanently Coupled to a Six-Wheel Motive Power Unit—Unusual Safety Devices Are Provided

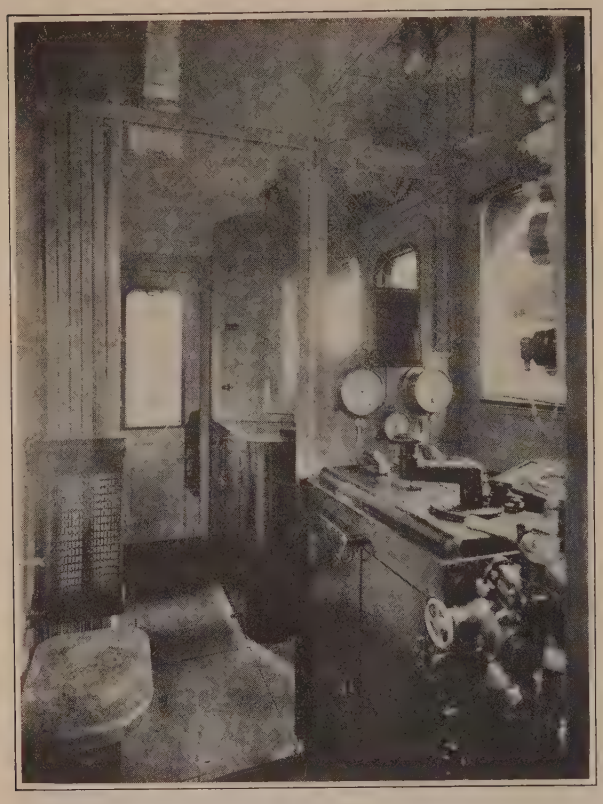
Combination Twelve-Wheel Locomotive-Car Used in Switzerland on Runs Where Traffic Does Not Justify Regular Train Operation

FOR service during slack periods when a long train is unnecessary, a combination locomotive and passenger coach is used by the Lötschberg Railway, which operates the section of the Swiss railways between Berne, Lötschberg and the Simplon. The new coaches are somewhat similar in design to those supplied by the Oerlikon Company in 1921 to the Burgdorf-Thun Railway. Electrical equipment is concentrated on a truck fitted with a leading axle and two driving axles, this truck being coupled to the main frame carrying the passenger and luggage compartments.

All the electrical equipment is in the locomotive portion. Current, single-phase 16⅔ period at 15,000 volts, is fed from the overhead collector device through isolating switches to the main current breaker, which is constructed for outdoor mounting. The circuit breaker is arranged for electro-pneumatic closing and for automatic electric release. A second pole of the circuit breaker is connected to the high-tension terminal of the transformer. The latter is of the oil-immersed, self-cooled type. In order to improve the cooling the transformer is inclosed in a second casing, into which air is drawn through the roof, passing over the transformer and escaping into the motor room.

The low-tension winding has eleven tappings which are connected to the motor as required for the various speeds, the highest voltage supplied to the motor being about 500. Connection between transformer tappings and motors is insured by means of twelve contactors that are controlled electro-pneumatically and are interlocked to prevent short circuits. They are arranged in the motor room. Passage from one notch to the next is insured without breaking the circuit in the usual way by means of a bridging coil.

Development of an hourly output of about 500 hp. at the wheel tires at a speed of 35 km. per hour (21.7 m.p.h.) was a requirement of the design. Another was that the motors should be as similar as possible to the spare motors kept on hand for the other electric engines of the company in order that they can be used in case of emergency. In view of this it was decided to adopt motors of the type supplied by the Oerlikon Company to the Bernese "Decree" railways that have been in successful use for a period of five years.



Motorman's Cab in Locomotive End of Combination Unit. Safety Devices Are Controlled by a Pedal and a Push Button

Each motor has ten poles, an actual one hour rating of 518 hp. at 21.7 m.p.h. and a continuous output of 425 hp. at 24.2 m.p.h. The highest speed is 40 m.p.h. The two driving axles are coupled together by means of a triangular system of rods and connected to the motor through a jackshaft. In this way it has been possible to use not only motors similar to those of the locomotives referred to but also the same gearing. Driving wheels are 4 ft. 4 in. in diameter, the gear ratio being 1 to 3.78. The controller is mounted on the motor frame, together with a fan set. The latter draws air from the motor room and drives it through the motor and out through the openings below. Multiple control and automatic acceleration are provided.

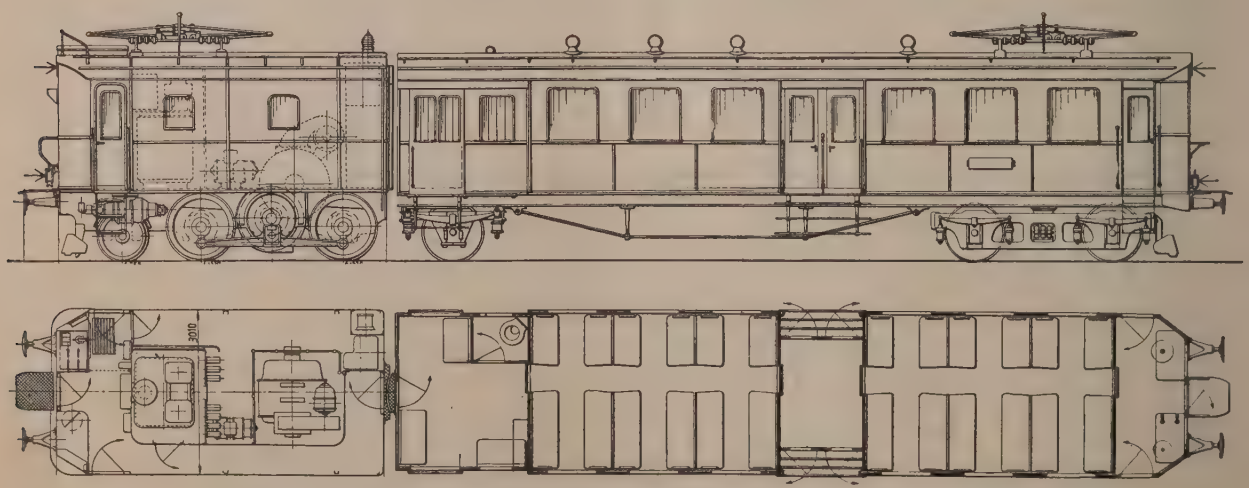
As they are intended for one-man operation, the cars have "dead man's" safety devices. Instead of having the safety device on the operating handle of the master controller, it is connected with a pedal which is depressed by the driver during the operation of the motor coach. When the pedal is released the motor circuit opens after a given interval, and the brake is brought into action by a relay. Within this interval, however, if the driver presses a push button mounted on the other side of the driver's cab, the switching off and braking is prevented. This arrangement was adopted to facilitate shunting operations, as the driver must under those circumstances be able to look out from one side of the cab or the other.

In order to permit of the vehicle being operated in either direction, the passenger coach is also provided with a driver's cab at the end away from the locomotive. Both the coach and the engine portion are provided with current-collecting apparatus.

Direct current at 36 volts for the control circuits and lighting is supplied by a 1-kw. motor-generator set and a battery of accumulators. Heating current for the different compartments of the coach is derived from the train heating bus lines. These are connected to a tapping of the transformer, giving 1,000 volts through an electro-pneumatically operated circuit breaker. The heating current for the driver's cab is obtained from the same supply system as the auxiliaries, such as the compressor set for the brake and the control gear. This supply system is connected to the 220-volt tapping of the transformer.

The coaches are each adapted to carry 60 passengers, although at times of heavy traffic five sitting and fifteen standing passengers can be accommodated in the luggage compartment. Over-all length of the engine proper is 21.6 ft. and of the complete vehicle 71 ft. 8 in. Total weight of the motor coach is 60.1 tons, of which the electrical equipment is responsible for 15.4 tons.

The vehicles were the joint production of three Swiss concerns, the Oerlikon Maschinenfabrik being responsible for the whole of the electrical equipment, the Swiss Locomotive & Machine Works, Winterthur, for the chassis and underwork, and the Swiss Industrial Company of Neuhausen for the body work.



Elevation and Floor Plan of Lötschberg Railway Locomotive-Coach. Seats for 60 Passengers Are Provided in the Main Compartment, with Fifteen Additional Seats in the Luggage Room

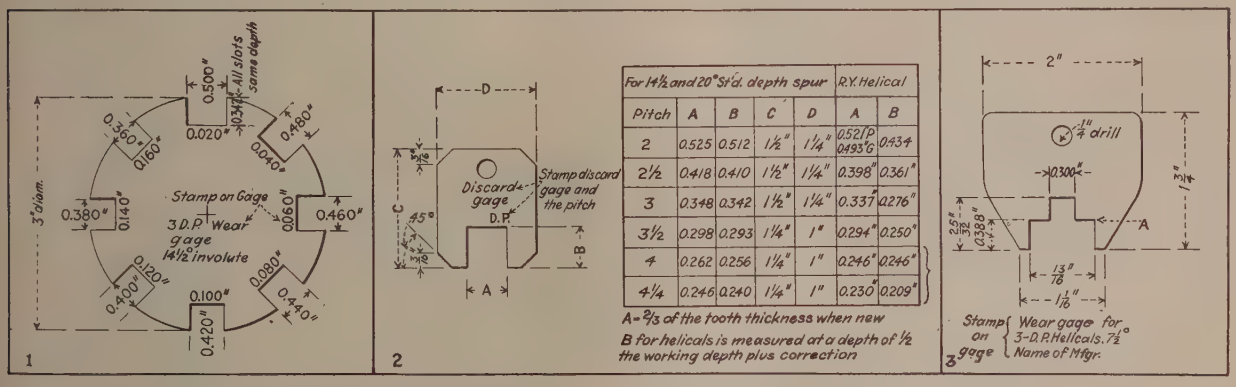
When Should Pinions and Gears Be Removed for Tooth Wear

By E. S. Sawtelle
Assistant General Manager Tool Steel Gear & Pinion Company, Cincinnati, Ohio

Gages Can Be Used Successfully on a Large Majority of Present-Day Gears and Pinions to Determine When Teeth Are Worn Out —A Few Abnormal Cases May Require Special Consideration

PRESENT practice of leaving to the judgment of inspectors the decision as to when a gear or pinion should be removed as having finished its useful life is unsatisfactory. Most superintendents of equipment and master mechanics would welcome some sort of a gage to decide when gears and pinions should be scrapped, but they seem to feel that the variety of tooth shapes and differences in gear ratios offer obstacles that prevent the use of a satisfactory gage. A study of this can be applied to any type of three-pitch pinion. The slots of this gage are all of the same depth and are equal to the corrected addendum for the pitch, but the width of each slot in the gage is varied so as to measure all the way from a new tooth to one worn out by progressive steps of 0.020 in. This gage should prove very handy for determining approximately how near worn out a pinion may be.

A discard gage is shown in Fig. 2, which can be used



For 14½ and 20° Std. depth spur					R.Y. Helical	
Pitch	A	B	C	D	A	B
2	0.525	0.512	1½"	1¼"	0.521P 0.493G	0.434
2½	0.418	0.410	1½"	1¼"	0.398"	0.361"
3	0.348	0.342	1½"	1¼"	0.337"	0.276"
3½	0.298	0.293	1¼"	1"	0.294"	0.250"
4	0.262	0.256	1¼"	1"	0.246"	0.246"
4¼	0.246	0.240	1¼"	1"	0.230"	0.209"

A = ⅔ of the tooth thickness when new
B for helicals is measured at a depth of ½ the working depth plus correction

Note: all gages of 3/16" cold rolled steel, case hardened.

Note: for helical pinions 4 D.P. and 4¼ D.P. use gage C-144

Fig. 1—Wear Gage for Three-Diametrical Pitch Gearing. This Provides for Gaging Wear Every 0.020 In.

Fig. 2—Discard Gage for Brown & Sharpe 14½-Deg. Teeth to Measure Worn Condition

Fig. 3—Discard Gage for Gearing with Long and Short Addendum Teeth, Helical Teeth and the Wisdom Tooth Pinion

the subject, however, shows that gages can be used successfully on the great majority of gears and pinions to determine when they should be removed. An occasional gear or pinion may wear abnormally, due to misalignment, bad bearings or some other condition. In such cases the tooth may be very badly worn at the top and thoroughly fit for rejection, though it may not show much wear at the gage point. Judgment must be used in connection with the gages to safeguard against a condition of this kind.

In order to illustrate the problems that are encountered in gaging gear teeth for wear, and also as a suggestion for types of gages that appear to be satisfactory for determining when gears or pinions should be scrapped, I have outlined in the accompanying diagrams several gages that should be of assistance to inspectors.

Where the standard Brown & Sharpe 14½-deg. gear or pinion is used wear at the pitch line can be determined by a simple snap gage which measures the wear from the top of the tooth to the pitch line. Fig. 1 shows such a gage, which can be read quickly and should be useful. readily on a Brown & Sharpe 14½-deg. tooth for measuring a worn-out gear or pinion. The dimension of *A* for the thickness of the tooth is usually taken as two-thirds of the original thickness at the pitch line of a new gear or pinion.

For a diametrical pitch of three this would be two-thirds of 0.523, or 0.348 in. The dimension *B* for the depth is the corrected addendum, which for a three-pitch pinion of about 14 to 17 teeth should be 0.345 in. This corrected addendum varies slightly with the number of teeth, but a gage for a depth of 0.345 in. can be used for any gear or pinion with a negligible error.

Several of the more modern tooth shapes depart from the Brown & Sharpe standard and have higher pressure angles. These include the long and short addendum tooth, the helical tooth and the wisdom tooth pinion. Originally these teeth are cut broader at the base and narrower at the top, with the result that frequently they may wear to a knife edge at the top before they are sufficiently worn at the center of the tooth to warrant discarding. Such a condition is shown in Fig. 4, to-

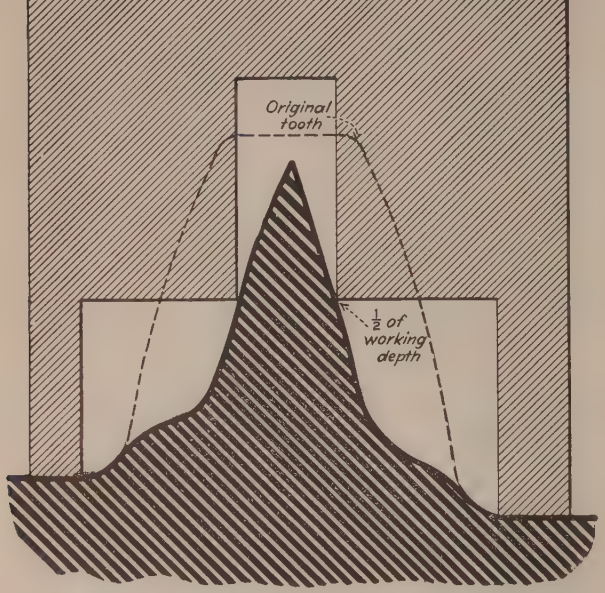


Fig. 4—Gearing with High-Pressure Angles Frequently Can Be Worn to a Knife Edge at the Top Before It Is Sufficiently Worn at the Center to Warrant Discarding

gether with an outline of the general type of gage that could be used to meet this condition. The gages shown in Figs. 1 and 2 cannot be used safely after the gear or pinion is worn to a knife edge. For such conditions a type of gage shown in Fig. 3 is recommended. This takes its height bearing from the root of the tooth. In this gage the offset at *A* is half way down the working depth of the tooth, and the thickness measured at this point is that at which the gear or pinion should be rejected. This is recommended to be two-thirds of its original thickness at point *A*. The vertical legs of the gage are of such length as to make the gage point *A* bear at the center of the working depth. The inside slot of the gage is such as to provide a clearance over the top of the tooth. This gage cannot be made universal, but a separate gage must be made for the gear and for each pinion with a different number of teeth. Likewise, an exact formula cannot be offered since there are variations used in the height and depth of the teeth for various types of gearing. The simplest method of getting dimensions for such a gear is to obtain exact data from gear manufacturers for the specific type of gearing used and make up a gage to suit individual ideas as to the degree of wear permissible before rejection.

During 1925 the number of accidents on the lines of the International Railway, Buffalo, N. Y., decreased 7.2 per cent. Serious accidents fell off even more, as shown by the fact that 10.28 per cent fewer persons were injured. During the *Courier* campaign against safety zone violators, I. R. C. employees turned in to the police 1,044 reports covering 1,235 violations of the ordinance establishing a 7-ft. safety zone around standing street cars. The campaign has greatly lowered the risk of accident to pedestrians and to passengers. A flashing signal was installed at Union Road on the Lancaster line and a new improved block signal system on the Buffalo-Niagara Falls High Speed line.

The Readers' Forum

Noise Reduction Should Pay Well

WISCONSIN VALLEY ELECTRIC COMPANY
WAUSAU, WIS., Feb. 9, 1926.

To the Editor:

Several very inspiring articles have appeared in the ELECTRIC RAILWAY JOURNAL of late, and no doubt they have been read with a great deal of interest by many men in the industry who are constantly trying to improve service in their different localities.

The reply to "Master Mechanic" by the chairman of the noise reduction committee is very appropriate indeed, and I believe this committee deserves the support of the entire industry and should be encouraged rather than discouraged. There will, of course, always be with us the man who is ready to throw cold water on any proposition, but fortunately those men are in the minority, and the committee should know this.

It is very gratifying to read the letter by Clinton D. Smith, who certainly takes a very optimistic view about the future of our industry, and we must agree that he is right when he states that the car is our show window and it is through the pleasing appearance as well as comfortable, speedy and safe transportation that we will get our message across to the public, and that only in this way can we expect to get patrons enough to make our industry profitable. "Master Mechanic" wonders where the money to improve equipment is to come from. It is by the improvement of equipment and track that patronage is going to be increased, but occasionally we find some executive who thinks he must either curtail service or cut down the appropriation for maintenance of equipment as soon as the seasonal drop in patronage occurs.

Such men are losing track of the fact that we are at a dawn of a new era in transportation. The standard of living in our country, we are told, is constantly ascending to higher levels. If that is so it holds true equally well in transportation. We cannot expect that people are going to ride in dirty, dilapidated cars, many of which are equipped with hard slat seats. Instead we must be up to date and offer them an attractive ride, on full spring cushions, in cars which are clean and attractive, not necessarily luxurious. The bus properly co-ordinated with railway service should provide our service de luxe at proportionately higher rates than we are now getting for electric car service.

A word in regard to noise. Our old, heavy equipment was very noisy. It was also clumsy and was not economical to operate. We found that we could operate cars of lighter weight with quite a saving, but most of us went to extremes in lightness. Certainly the safety car has not proved less noisy than the old heavy equipment previously operated.

Within the last few years the car builders have brought out cars which they believe—and I think they are right—would strike a medium between the old heavy equipment and the too light safety car. This medium-weight double-truck car has met with favor among the operators as well as the riding public. It has a much more pleasing appearance, is more comfortable and speedier. Certainly the noise is considerably reduced and the cost of operation less.

The reduction of noise can be extended to the track structure as well as to the rolling stock. The more resilient the track structure the less noise will be noticed, and I believe that in all future trackwork, either new or reconstruction, serious consideration should be given to materials now on the market which have been proved to make the track resilient, and without movement enough to disturb pavement in the track area. On test track in different localities resilient construction has proved very popular.

The Wisconsin Utilities Association has a railway fellowship at the University of Wisconsin. The young man who is taking the course this year was given as his subject to study, "The reduction of noises in equipment." A committee of three operating men was appointed to confer with this young student and to guide him. He is free to call on any of the operators at any time for information which will help him in his work, and I have no doubt that when he makes his report next summer it will be of great benefit not only to us here in Wisconsin but to the entire industry.

I feel that the industry ought to get behind the committee on noise reduction and give it the support it so well deserves.

I have just read the address delivered by Mr. Budd at Indianapolis, and if all utility operators would look at the future as brightly as Mr. Budd does there would be no cause for worry, as every man would then be up and doing all the time.

NELS C. RASMUSSEN,
Superintendent of Railways and Chairman Railway Section Wisconsin Utilities Association.

Additional Information Concerning Number of Employees in Seattle

SEATTLE, WASH., Feb. 5, 1926.

To the Editor:

After reading the editorial in the Dec. 12, 1925, issue of ELECTRIC RAILWAY JOURNAL entitled "Cold Comfort for Municipal Ownership Advocates in Seattle Experience," I wish to call your attention to certain features of the situation not mentioned in that article. Acquisition of the street railway lines by the city occurred in April, 1919. Prior to this acquisition the total number of street railway employees was 1,876.

EMPLOYEES IN SERVICE OF SEATTLE MUNICIPAL STREET RAILWAY

	April 1, 1919*	April 1, 1920	Dec. 1 1925
Transportation:			
Dispatchers, schedule clerks, inspectors, starters, and station masters	39	44	30
Office	15	36	17
Trainmen	1,289	1,439	1,220
Shops and carhouses	325	461	287
Way and structures	169	234	285
Accounting	39	40	36
Accounting, stores department	†	26	16
	1,876	2,280	1,891

* Figures under April, 1919, include employees of the traction company and city employees engaged in operation of a municipal car line.

† The number of employees in the storeroom of the accounting department of the traction company not known at this time.

This figure includes those engaged in the operation of a municipal car line. Between April 1, 1919, and April 1, 1920, the number rose to 2,280. On March 22, 1920, a reorganization occurred which created a railway division of the public utility department. When this reorganization was completed and put into effect the services of 236 employees were disposed of. Due to further economies and reductions since that time, we had in our employ on Dec. 1, 1925, only 1,891. During the time that this reorganization has been in effect we established the basic eight-hour day. We allow the trainmen one day off in eight on their own time and have increased the number of car-hours on account of the installation of bus service in different sections. At this time 55 per cent of our operation is one-man. When the city took over the line from the traction company there was only a very small percentage of one-man operation. A tabulation of the number of employees at different dates is given in the opposite column.

There is considerable discrepancy between these figures and those which you quoted in your editorial from one of the Seattle newspapers. I thought you would be interested to know of this difference and to publish a correction.

D. W. HENDERSON,
General Superintendent.

Payroll Time Not Running Time

Feb. 15, 1926.

To the Editor:

In your issue of Jan. 30, page 195, there is a letter to the editor headed "Buses Faster than Electric Cars in New York." The writer bases his conclusions on a comparison of vehicle-miles and vehicle-hours, including layovers and delays. This is an error which is often accepted from statistical data and yet it is no true showing of the speed of a company's cars. Actual speed is determined by the average running time between terminals, excluding layover time and all other payroll time such as that allowed for reporting, turning in, meal relief, making out reports, etc. I do not know if the New York figures would show if it were possible to exclude these items from the New York Transit Commission reports showing car-hours, which generally mean payroll hours. I might mention in this connection that on certain properties the excess time is considerable, going to as much as 20 per cent over and above that spent in operating cars between terminals.

FAIR PLAY.

Credit Union Organized in Atlanta

GEORGIA already has one credit union, the Public Service Credit Union, which recently began operations under the auspices of the Georgia Railway & Power Company in Atlanta. A charter was secured by this union and organization was effected on Jan. 12, with an initial membership of 30, a stock subscription of 137 shares, at $5 a share, and excellent prospects for work among the 5,300 employees of the company.

The entrance fee has been placed at 25 cents and a member can start in it by taking out a single share. No member can hold more than 100 shares of stock, and no member can have more than $500 in stock or cash on deposit.

Two kinds of loans are made—a "character" loan and an "indorsed" loan. The character loan may run as high as $50 and is made, in the judgment of the credit committee, on the character of the applicant. This provides for emergency cases when an employee needs money quickly and cannot offer security for it. The indorsed loan may run to as high as $250, but must bear the indorsement of other members of the organization or some responsible person. These two types are expected to take care of the loan end.

A special feature will be the savings bank, which will lend out money at 6 per cent and pay 4 per cent for deposits, the difference of 2 per cent going to take care of the expenses of operation.

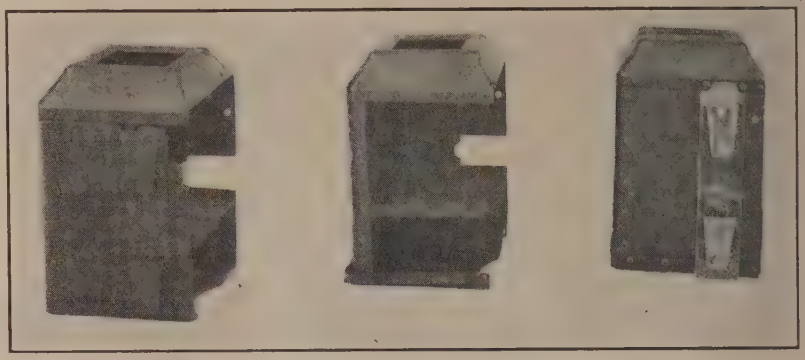
Equipment Maintenance Notes

Strengthening Fare Boxes During Repairs

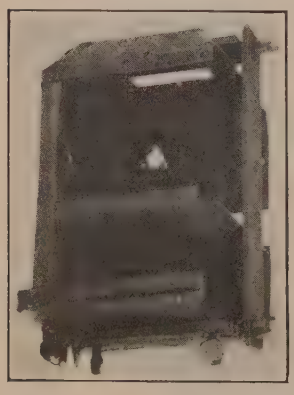
PASSENGERS alighting from electric cars frequently find the fare box a convenient place to hang onto for support until the car stops. As a result the supporting side of the fare box is frequently subjected to severe strains. The Eighth Avenue Railroad, New York City, has had a considerable number of breakages of the metal on the supporting side of Johnson fare boxes along the top edge. In repairing these, C. P. Westlake, supervisor of equipment, has arranged a strengthening plate of steel 5¾ in. x 4 in. x ¼ in., which he installs and rivets inside to strengthen the point where failures occur. In order to provide a satisfactory and economical job several fixtures and jigs are used for the drilling and riveting operations in doing the work.

One of the accompanying illustrations shows the casing of three Johnson fare boxes; the one at the left in the illustration is a box before any repairs are made. This shows the breaking away of the metal at the top right hand corner. In repairing these boxes the first operation is to cut away the supporting side as shown in the center one of the fare boxes. The fare box at the right shows the finished job after repairs and reinforcement have been made. In order to hold the box in position after the side has been removed while work of drilling and riveting is being done a clamp is placed around the box. A second illustration shows this clamp in position. It has a number of thumbscrews for adjustment and tightening. Another illustration shows the fixtures used for doing the work. In this view the jig at the left is for drilling the new side plates which are installed.

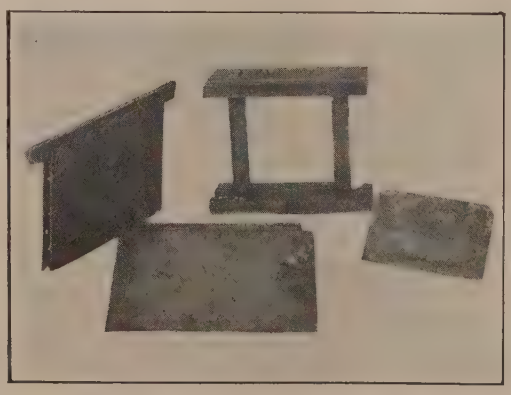
One of these plates is shown in the foreground of the illustration. The jig is made with two sides and the plate to be drilled is slipped between these and held firmly in position during the drilling operation. The reinforcing plate is shown at the extreme right in this illustration and a fixture for riveting in the background. This fixture is placed inside the box and, with the clamp shown in another illustration, makes firm support so that the riveting can be done satisfactorily. By this method of strengthening the supporting side of boxes during repairs the number of boxes which require work to be done for breaking away of the supporting side has been reduced considerably.



Fare Boxes Before and After Repairs Have Been Made
At left, casing with broken supporting side. In center, the supporting side has been cut away while making repairs. At right, completed casing after repairs have been made.



Clamp Used to Hold Fare Box in Position for Drilling and Riveting



Jigs and Fixtures for Repairing Fare Boxes
At left, jig for drilling supporting side plates; in foreground, side plate before being drilled. At right, reinforcing plate; in background, fixture for riveting.

Hinged Apron Permits Easy Repairs to Cars

IMPROVED appearance of cars is one of the important factors in the campaign of modernization with which electric railway operators are bringing back the business that is logically theirs. The smart street car today is wearing an apron. The old-fashioned car set high over the trucks and displaying a confusing array of wheels, brake rods, motors, air compressors, etc., is quite out of harmony with the streamline designs and complete inclosures of the modern automobiles and buses which crowd the cars on every highway. Along with steps to make electric railway equipment more comfortable and less noisy, the elimination of this objectionable appearance of cars is being given careful consideration on a maintenance basis.

A simple method of accomplishing this purpose even on old cars is the apron in use by the Grand Rapids Railway, as illustrated herewith. William Goldner, master mechanic, reports that the original aprons were put on solid all the way around, which was not satisfactory due to the fact that it was almost impossible to get to the trucks for oiling, repair work, etc., without removing the apron, a defect which

Metal Moldings at Top and Bottom of Hinged Aprons Give Finished Appearance and Add Streamline Effect

he expects to remedy by putting the apron on hinges, as shown, which is the first apron built in that manner. This apron is $\frac{3}{8}$-in. Plymetl, faced with steel on both sides. This provides great resistance to breakage or puncture with minimum weight. It is easily made and simple to maintain. Mr. Goldner says in the future he would prefer and specify $\frac{1}{4}$-in. Plymetl.

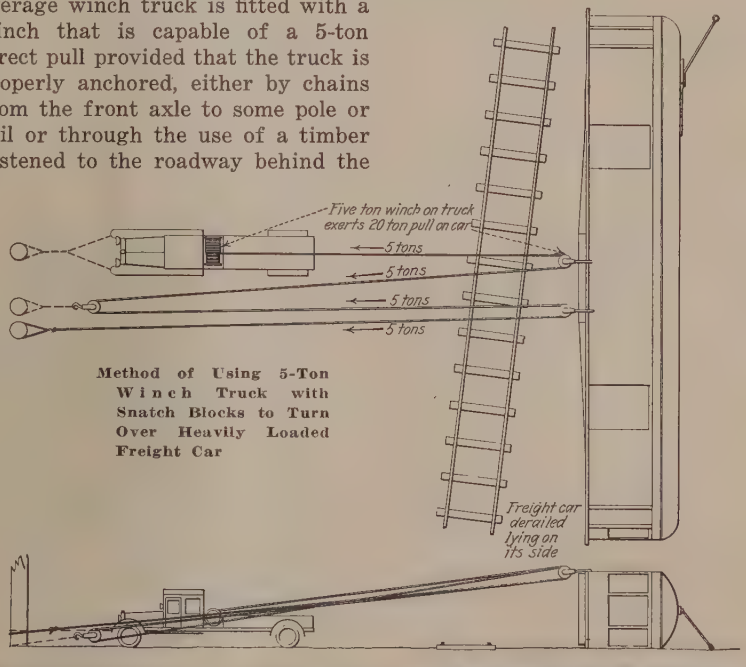
The apron shown is also the first one made with the metal molding running along the bottom. The top molding is screwed to the car proper so that when the apron is hanging down in place it has the appearance of having the molding all the way around, whereas the molding is fastened only to the bottom portion of the apron, while the top edge of the apron will be perfected by one metal face being broken over the edge.

Five-Ton Winch Truck Clears Freight Wreck

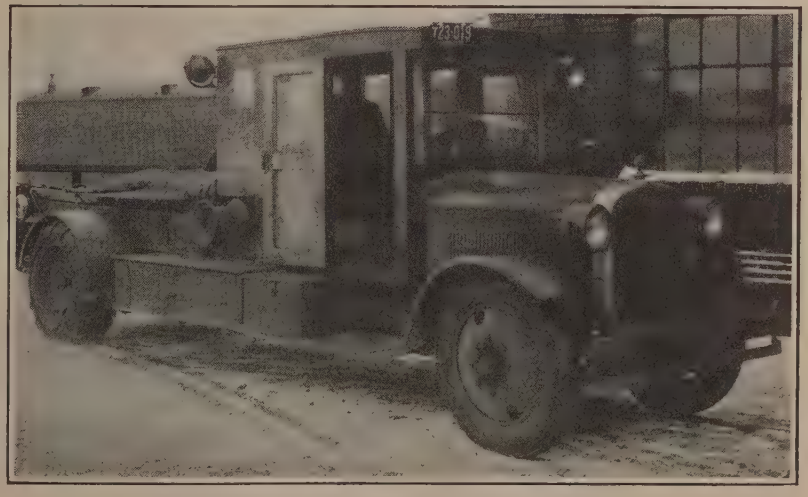
By Pierre V. C. See
Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio

MOST city properties realize the possibilities of using trucks for street car wrecking. Their ability to get to the point of trouble in a minimum of time provides a speedy method for rerailing cars and clearing minor wrecks. It seems, however, that few properties realize the great possibilities offered to use the winch-type truck and a snatch-block combination for clearing up large interurban and freight car wrecks. The track and line departments of most electric railway properties are provided with winch trucks, which are available in case of emergency. Where the railway itself is not provided with such trucks it can usually secure the use of them from large auto towing concerns. The average winch truck is fitted with a winch that is capable of a 5-ton direct pull provided that the truck is properly anchored, either by chains from the front axle to some pole or rail or through the use of a timber fastened to the roadway behind the truck. A 5-ton direct pull will haul the car or truck back to the track and rerail it, and if the car is in a ditch or turned over the power furnished can be multiplied by attaching additional lines with snatch blocks. Each line adds an additional 5-ton pull.

The accompanying sketch shows how a 5-ton truck was used to turn over a 43-ft., 40-ton freight trailer which was laying flat on its side. In this particular case it was impossible to get a line under the car so as to provide a rolling hitch. Had this been possible the matter of turning the car over would have been simplified somewhat. As it was, the line was connected to the highest point on the bottom of the underframe. This was at the end of the bolster



Method of Using 5-Ton Winch Truck with Snatch Blocks to Turn Over Heavily Loaded Freight Car



Type of Truck Used for Wrecking Repairs by the Northern Ohio Traction & Light Company

and top of the needle beam. By using four lines as shown in the sketch, it was a very simple matter to turn this heavily-loaded freight car over to an upright position with one pull.

The winch truck that was used on this job is shown in another illustration. It has a six-cylinder chassis with 36x6 pneumatic tires, duals in the rear. A large cab is provided so that seven men can be seated very comfortably inside, while the open body is used for carrying jacks, blocks and other wrecking material. This particular truck is capable of making a speed of 40 m.p.h. and makes nearly as good time as can be made with a touring car in getting to a wreck promptly. In the particular case mentioned the wreck was more than 40 miles from the shop, so this speed was of decided advantage in clearing the tracks promptly.

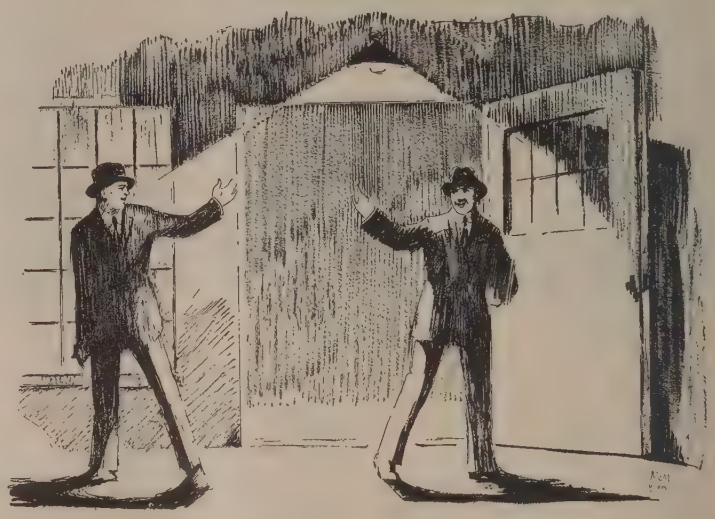
Bolted Anchor Plate Used to Hold Trolley Wire

UNTIL recently the Union Street Railway, New Bedford, Mass., experienced some difficulty with the type of anchor plate used to hold trolley wire. It had been the practice to solder the usual eyebolt clamp to the trolley wire and then attach the anchor wire to the clamp. It was found, however, that the heat from soldering had made a weak place in the trolley wire. It was also noted that the soldered surface of the clamp was so small that the trolley wire bent very easily when any extra pressure was brought to bear on the anchor wire. These defects frequently caused a breaking of the trolley wire.

To overcome these difficulties, Peter Dupuis, line foreman, designed a type of anchor plate that has proved very satisfactory. A piece of ⅛-in. machine steel plate, 8 in. long and 5 in. wide, was bent V-shaped. This plate was held together at the top by three 1½-in. x ⅜-in. machine bolts. Below these bolts is an 8-in. piece of ½-in. square machine steel, through which four 1½-in. x ⅝-in. setscrews are passed. The bottoms of these setscrews bear on an 8-in. piece of ⅝-in. square machine steel. When the anchor plate is in use this piece of steel rests on the trolley wire. By tightening the setscrews the ⅝-in. steel rod presses the trolley wire against the bottom of the V-shaped plate, while the ½-in. steel

Dick Encounters Difficulties

And Discusses Maintenance Cost Records



IT WAS far into the night when Dick Prescott, engineer of equipment of the Consolidated Railway & Light Company, and Steve White, carpenter foreman, decided to call it a day and go home. They had struggled long and wearily in the endeavor to arrive at a method of estimating the excessive maintenance cost on some of the antiquated equipment operated on their property.

"There are so many factors involved in this darn thing," said Dick, when they finally began to pack up thir papers, that it's almost a guess to try to get any comparision from the meager records that we've got available."

Dick picked up the pad on which they had been working. "It would be simple if the accounts were divided for different groups of cars," he remarked as he cast his eye down the row of items they had listed. "In addition to the costs," he continued, "I would also like to see pull-ins classified by car types. Gee! I'll bet that would tell a story that would soon show our practice up in a new light."

"I can remember one case," said Steve, "where we got to looking into the number of rewinds on one particular type of armature, and everybody was surprised to learn that the darn things were being rewound more than an average of once every year. No one knew how long that had been going on, until we happened to stumble onto it. If the accounts had been set up in the right way, the cost of maintenance on that type of motor would have stood out like a sore thumb."

"Well, all this is fine for the future, but we haven't got very far in estimating the costs for some of the equipment we now have in service."

"We can't get very far with that," replied Steve. "I've been digging up all the figures I can get hold of, but they don't give much. I do think, though, that I can get some estimates together now for the old 200 series cars that we're overhauling and the new 1200s."

"How are you going to get at it?" queried Dick.

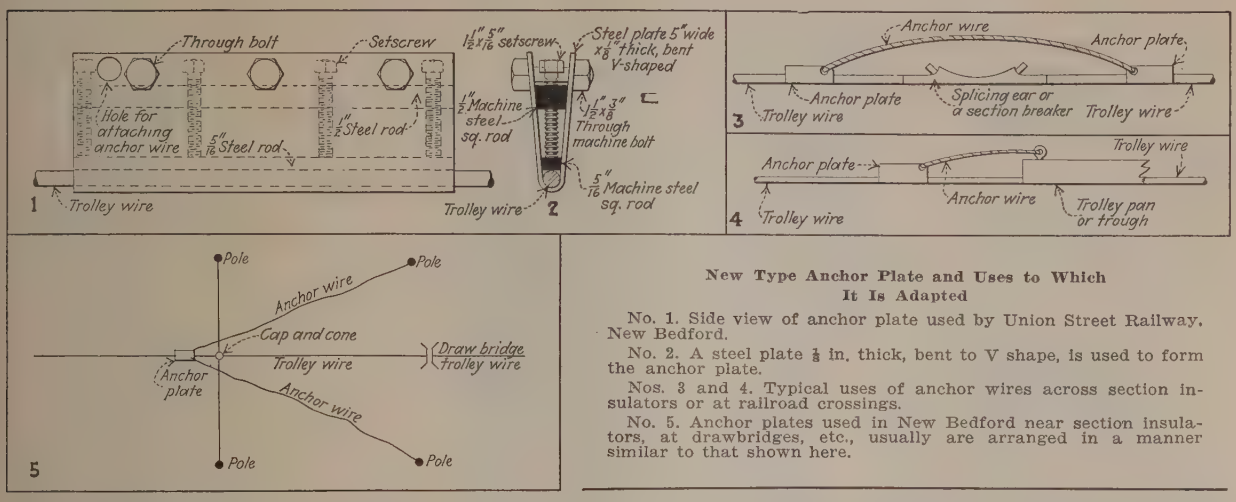
"Well, I know about what we're spending on the bodies. I can get a fair estimate of the truck job from Bill Johnson, the truck shop foreman. Then, you see, Mike over at Center barn has all the 200s and some of the 1200s. I think he keeps some records of his own that may help us out. We've got power meters on both these groups of cars, and it won't be much of a trick to find out how much the power saving on the new cars amounts to. I also think Mike can check up his pull-ins and tell us how they compare on the old and the new cars. That's about as far as we can go."

"Even if that's all we can get together, I think it's worth talking over with the old man. He's working on the budget for next year and he could use that estimate for putting in a recommendation that we buy a group of new cars to replace the 200s and stop this heavy rebuilding program on them. Gee, I'll bet the money we're spending right there would more than pay the interest on new cars."

"Yes, but what about the capital?"

"You've got energy saving, faster schedules and reduced pull-ins to figure on. That's without allowing anything for the increased riding that would be bound to result if we took those old gunboats off the street. There's no question in my mind but that we've been blindly hanging on to some of this old stuff long past the time when it was profitable to do so. Of course, it's not up to us to say what's to be done, but it's a good thing to give the old man the dope. I'll bet if he takes that kind of a proposition into the staff meeting the transportation department and the new commercial department will be ready to hug him."

"Well, all right, Dick, I'm going to beat it for home before my wife comes after me. It's going to be kind of interesting to see what the old man has to say."



New Type Anchor Plate and Uses to Which It Is Adapted

No. 1. Side view of anchor plate used by Union Street Railway, New Bedford.

No. 2. A steel plate ⅛ in. thick, bent to V shape, is used to form the anchor plate.

Nos. 3 and 4. Typical uses of anchor wires across section insulators or at railroad crossings.

No. 5. Anchor plates used in New Bedford near section insulators, at drawbridges, etc., usually are arranged in a manner similar to that shown here.

rod presses against the three through bolts at the top of the plate. By this means the plate is securely held in place on the trolley wire. As will be noted, the trolley wire is not damaged by soldering and remains intact when the anchor plate is removed. This has proved advantageous when it is found necessary to change the location of the anchor plate.

Various uses have been made of these anchor plates. They are used to hold an anchor wire where section breakers or splicing ears are located and wherever any strain on the trolley wire must be relieved. Trolley wires that go into trolley troughs or dead-end at drawbridges are an example of these uses. These anchor plates are also used in locations where there is a long stretch of unanchored trolley wire, to prevent strain on the span wires. Not only have these anchor plates proved inexpensive to make but they have given satisfactory results in the several hundred places where they have been in use.

Double Sectionalizing Switch for Oil Sidings

By L. H. Appel
Assistant Superintendent of Power Pacific Electric Railway, Los Angeles, Cal.

TO SAFEGUARD the loading and unloading of petroleum products the standard practice of the Pacific Electric Railway is to install a combined trolley and track sectionalizing switch on all spur tracks serving industries which handle oils and gasoline. This provision, together with that of installing insulated flange unions in pipe lines, has proved very effective in preventing electric sparks, which under certain conditions may cause serious troubles in the presence of fuel oil, distillates of gasoline, etc.

The double sectionalizing switch de-energizes both the trolley wire and the track at the siding, thereby removing any potential hazard that might exist if the trolley were left energized while tank cars were being handled. A double-pole, single-throw switch is used, which consists essentially of two copper blades fastened to insulators which are installed on cross-arms attached to the pole. One blade is used for controlling the trolley circuit and the other for the track circuit. A standard maple sectionalizing insulator is inserted in the trolley wire and white fiber insulated joints in the track.

Combined Trolley Wire and Track Sectionalizing Switch in Open Position

The trolley switch blade when closed permits the circuit to be completed or shunted around the circuit breaker and similarly the track switch blade permits the circuit to be shunted around the insulated joints, thereby allowing normal operation of the spur. Both blades of the switch are operated simultaneously by means of a long pole permanently fastened to the insulated blade head. This can be padlocked in either the open or closed position by train crews.

The switch is kept open normally so that the trolley and track are de-energized and is closed only when the spur is actually in use for electric operation. In addition to the use of this equipment for sidings serving plants where oils are handled, which include approximately 75 installations, a number of single insulating switches have been installed on sidings which serve industries operating clamshell shovels or other loading and unloading equipment which might come in contact with the trolley wire. The single switch installations provide for an insulator in the trolley wire only, as it is not necessary to insulate or de-energize the track.

Labeling Parts in Storeroom Shelves

DUE to the miscellaneous character of maintenance parts stored in the storeroom of the Southern Pacific Company at its Beaverton, Ore., shops, a flexible method for installing labels is required. An entirely satisfactory method has been devised through the use of a long metal slide 2 in. wide which runs the entire length of the storeroom shelves. These slides per-

Metal Slides for Inserting Labels Are Used in the Storeroom of the Southern Pacific at Beaverton, Ore.

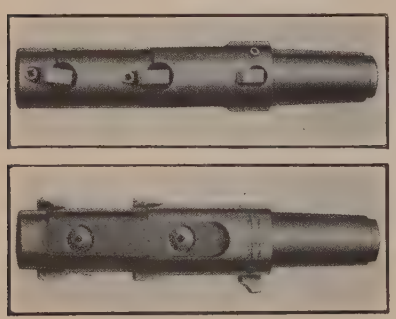
mit labels for the adjacent parts to be inserted where required, and after insertion they are protected with celluloid covers. This keeps them clean and gives a neat appearance.

Space required on the shelves for the storage of parts can be more economically used with this construction as the parts can be placed so as to make the best arrangement without regard to the location of labels.

New Equipment Available

Car Wheel Boring Tool with Wide Range Expansion

DESIGNED for the heavy-duty service of boring electric railway car wheels, a boring tool has recently been placed on the market by



Heavy-Duty Car Wheel Boring Tool

the Liberty Machine Works, St. Louis, Mo. The new boring tool has a triple arrangement of cutters, each set boring independently of the other. One set is for the rough-boring operation and a second for the finishing. The arrangement is such that the finishing cutters engage immediately after the roughing cutters clear the work. After the finishing cut is taken a third pair at the top of the tool chamfers the hub.

Each pair of cutters is uniformly expanded to the desired size by means of a cam arrangement controlled by a micrometer dial graduated in thousandths. This insures close adjustment to the desired size. One of the features of the tool is the hardened cutter support, the purpose of which is to insure a rigid holder for the cutters and to prolong the life of the tool by preventing disintegration on the surfaces where the tips come in contact with the tool body.

These hardened cutter supports permit setting the roughing cutters to the correct rake and angle. The cutter is set at this rake instead of grinding away part of the surface, as is the general custom. By inclining the roughing cutters, their life is materially increased, the tendency to heat is decreased and faster speeds are permitted.

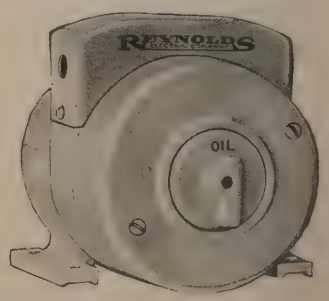
The new car wheel boring tool has a wide range of cutter expansion the purpose of which is to reduce cutter costs by using more of the high-speed steel on each set of cutters. The cutter locking device consists of a special screw lock which locks both cutters metal to metal. This arrangement insures uniformity of sizes and gives rigidity.

The tool is furnished in ten different sizes for boring steel, chilled or cast-iron car wheels. Sizes for the former range from 3¼ in. to 4¼ in. to 6¾ to 9½ in. and for the latter from 3 in. to 4¼ in. to 5¼ in. to 7¾ in.

Motor-Driven Flasher Unit for Warning Signals

RUGGED construction and small size are outstanding characteristics of a new unit flasher just brought out by the Reynolds Electric Company, Chicago, Ill. This flasher is for use with warning signals, crossing lights, blinkers, traffic guides, etc., as used by electric railways. The flasher mechanism is driven through a train of gears from a standard motor and all the mechanism is built into the special motor frame, so that the flasher is self-contained. The flasher is furnished with either one, two or three brushes, so as to handle a like number of circuits. The brushes ride the contactor drum without movement or vibration and special precautions have been taken which provide long life. The contactor drum operates on a quick make and break principle which is new in flasher construction and gives increased life and reduces failures.

The capacity of the unit is from 400 to 800 watts per circuit. The



New Self-Contained Unit Flasher

mechanism can be installed either inside or outdoors and its small size permits of mounting on a shelf against a wall if desired. The units are finished with two speeds, 60 r.p.m. and 7 r.p.m., so as to give respectively speed for flashing circuits on and off 60 times per minute or seven times per minute.

Association News & Discussions

Bus Maintenance and Lacquer Painting Discussed by C.E.R.A. Master Mechanics

Annual Meeting of Central Electric Railway Master Mechanics' Association at Akron, Ohio, Was Attended by Fifty Men from Central District—Topics of Interest to Interurbans Discussed

LIVE topics of particular interest to master mechanics brought out 50 men for the annual meeting of the Central Electric Railway Master Mechanics Association held at Akron, Ohio, on Feb. 11. The business session began at 9 o'clock and with an adjournment of one hour for lunch continued up to 2:30 p.m., after which an inspection trip was made through the shops of the Northern Ohio Traction & Light Company, where demonstrations were witnessed of equipment and methods used in maintaining buses and a demonstration of lacquer painting of electric cars.

Of the various committee reports, that on uniform charges to interchange of equipment brought out considerable discussion. F. J. Foote, chairman of the committee, presented the report, together with a revised list of prices for air-brake equipment. The report, including the revised prices, was adopted.

A committee was appointed to arbitrate disputes as to the responsibility for payment of parts replaced in interchange freight service. C. W. Squier, secretary of the equipment committee of the American Electric Railway Engineering Association, presented a request for consideration by the Master Mechanics' Association of two specifications now in the Engineering Manual. These specifications were E 100-12 for automatic couplers for interurban cars and radial draft rigging, including M.C.B. specifications for couplers, and E 101-12 specifications for the location of the end connections on interurban cars used in exchange service. No revisions to these specifications have been made since 1912, and as both refer to interurban equipment it was thought that the Central Electric Railway Association men were in best position to recommend changes in revision. The matter was referred to the standards committee of the association for study and report at the May meeting.

D. A. Scanlon, general superintendent of the railway department of the Northern Ohio Traction & Light Company, referred to a request which he had received from the Cleveland Railways to provide lights on freight trailers which operate through the streets of Cleveland. It appears that several accidents have occurred from automobiles running into cars which were without light. A committee was appointed to study the subject of providing a satisfactory method of illuminating the freight trailers so that such accidents will be prevented and so that a uniform method can be used by all roads of the district. This committee is to report at the May meeting of the association. Mr. Scanlon also brought up the subject of providing containers for way bills in interurban freight cars. After some discussion of this subject, it was referred back as being out of the field of activities of the Master Mechanics' Association. Discussion of the subject of loading cars beyond the stenciled weight brought out the fact that sometimes cars were loaded far beyond what they are supposed to carry. More attention will be given to this subject, as the tariff is supposed to be based on the stenciled weight with 10 per cent overload allowed.

Several changes were suggested in truck construction for the standard freight trailer which was adopted by the association. These changes were presented by a representative of the American Car & Foundry Company, and included some points which will reduce cost of construction and also provide increased life to trucks. The changes were approved and drawings will be changed to correspond.

The new officers of the association elected are: P. V. C. See, superintendent of equipment Northern Ohio Traction & Light Company, president; E. B. Gunn, master mechanic Western Ohio Railway, vice-president; together with an executive committee consisting of Fred Heckler, superintendent of motive power Lake Shore Electric Railway; F. J. Foote, superintendent of motive power and equipment Indiana, Columbus & Eastern Traction Company; J. W. Osborne, superintendent of equipment Terre Haute, Indianapolis & Eastern Traction Company, and A. W. Redderson, superintendent of motive power Indiana Service Corporation. A resolution commending the work of the retiring president, T. H. Nicholl, superintendent of motive power Union Traction Company of Indiana, was presented and adopted. He was also appointed as new chairman of the standards committee in place of C. M. Bange, resigned.

Two papers were presented, abstracts of which appear elsewhere in this issue. The first was a discussion of the lacquer system of painting, presented by J. S. Spratt of the Valentine Paint Company. In the discussion following presentation of this paper, questions by the master mechanics brought out information that the manufacturers do not recommend the applying of lacquer paint on top of old painting, as the old surfaces vary greatly and consequently varying results are obtained, many of which are unsatisfactory. Where paint is entirely removed the lacquer does not penetrate the wood, therefore some appropriate filler must

Master Mechanics of Central Electric Railway Association in Attendance at Akron Meeting

be used. Mr. Spratt said that the fourteen hours time given for finishing an average car requires a room temperature of at least 65 deg. No special spray gun is needed for the application of lacquer paint, and there are no special requirements by the fire underwriters over what is required for varnish removers. The powder that settles from the use of lacquer painting systems is not an explosive. Where spots are slow in drying this is evidence that the surface to which the lacquer paint is applied has not been thoroughly cleaned. After the lacquer paint has been applied cleaning with a dry cloth or with water is recommended. Car cleaning preparations can be used with success, provided they do not contain an excessive amount of alcohol. There are some lacquers that can be applied with a brush, but the spraying method is more satisfactory and more economical. The brush lacquers are improving rapidly and there are some over which varnish can be used, but the large majority cannot have varnish applied with success. There was considerable discussion as to economies that could be expected from the use of lacquer painting. The principal one of these results from the rapid drying of the lacquer paint so that cars are not out of service for extended periods. The general opinion of the master mechanics present was that there is no particular saving in time of application over that which would be obtained by spraying paint or enamel. Lettering can be done successfully with either lacquer paint, oil type paints, or enamel. P. V. C. See said that he had nine different kinds of lacquer paint in use. These were all applied over old paint surfaces. None has been in use a sufficient length of time to show definite results for comparisons.

A very complete paper on bus maintenance and gas engine operation was presented by E. Wooton, sueprintendent of equipment Chicago Motor Coach Company, an abstract of which is published elsewhere. Questions to Mr. Wooton brought out information that he renews oil every 2,500 miles and that he does not attempt to reclaim oil. The amount of extra equipment required for maintenance and overhauling is about 2 per cent for wrecks, overhauling, cripples, etc., and an additional 2 per cent for inspection. Probably a total of 5 per cent would be a good average figure to use. During the winter season in Chicago, radiator covers are used, but no alcohol is placed in the radiators. Skid chains are not used. The cost of maintenance by the Chicago Motor Coach Company during the past year was approximately 5½ cents per coach-mile. Mr. Wooton said that his company hoped to reduce this to 5 cents during the coming year. Depreciation of buses now used in Chicago is figured on a ten-year basis. Of course, this would vary considerably in different localities. The company has a very complete record system, so that it can tell when maintenance costs amount to more than the interest would be on the investment for a new coach. This accurately determines the point at which it is economical to scrap old equipment. Present equipment used in Chicago does not have starters, but Mr. Wooton said that larger equipment of six-cylinder engines would need starters. The scheduled speed is 10 m.p.h. in Chicago. This is figured by taking the mileage operated by the buses and dividing by the payroll time.

D. P. Cartwright of the North East Electric Company, Rochester, N. Y., presented two reels of motion pictures showing the electric starting, generating and ignition systems of buses.

The business sessions of the Master Mechanics' Association were held in the Terminal Building of the Northern Ohio Traction & Light Company, and this company also furnished a very attractive luncheon at the Portage Hotel, which was attended by the master mechanics and their friends. After the business session was completed, buses conveyed the party through the downtown garage of the company and out to the Kenmore Shops, where demonstrations were given regarding methods used in maintaining buses and also a very complete demonstration of the lacquer painting system. This latter demonstration was given by representatives of the Valentine Paint Company and included the application of all the various coats to an electric car. The car had been previously prepared with sections partly finished, so that the application could be demonstrated in a short time. This demonstration was with the application over old paint, and also included work necessary for patching. The next meeting of the association was arranged to be held in Decatur, Ill., some time in May.

Lacquer Painting Reduces Time Needed for Drying*

By J. S. Spratt
Valentine Paint Company

PAINTING by the nitrocellulose system involves three principal materials, primer, surfacer and enamel—each a nitrocellulose product, engineered to perform correctly its special function and capable of combining the completed system into a perfect whole.

Nitrocellulose primer is a true nitrocellulose material and forms the foundation of the nitrocellulose system. It is a nearly clear material carrying only sufficient finely ground red oxide of iron to enable the operator to see whether or not he has applied an even coat over the entire surface and it possesses adhesive qualities equal to the best varnish or oil type primers. It is furnished ready for application and is applied with a spray gun in a thin, even coat. It is suitable for use on metal of all kinds or wood surfaces. However, on new wood it is necessary first to apply a coat of oil type primer or wood filler such as standard paste wood fillers. This is necessary because lacquers do not penetrate wood, forming only a protective film on the surface, and to prevent moisture creeping into the wood through some break in the film which would cause the nitrocellulose material to peel it is necessary to use a penetrating material of this type.

Nitrocellulose gun glaze or surfacer is the material that might be termed "the keystone of the arch of the complete nitrocellulose system." It clings perfectly to the nitrocellulose primer and forms a perfect surface on which to apply the nitrocellulose enamel. It takes the place of the usual lead, half and half glaze, surfacer or rough stuff and sealer coats, thereby greatly simplifying the system as well as increasing its durability. Nitrocellulose gun glaze or surfacer possesses remarkable filling properties and goes on very smoothly. For use on cars it can be applied to give a sufficiently smooth surface without sanding. However, on buses, or where a perfect surface is demanded, it may be sanded readily to extremely smooth surface. Gun glaze or surfacer may be double or triple coated at one operation, applying more material where surface conditions call for a heavier coat, or it may be applied one coat at a time as desired. It air dries in a few hours at ordinary room temperature, ready for water sanding. Where the surface is not to be sanded, nitrocellulose enamel may be applied within an hour after the application of the last coat of gun glazer or surfacer.

The third and final material of the nitrocellulose system is nitrocellulose enamel. It is applied by the usual spray methods and it will be found that it sprays on very smooth and with quite a sheen. It can be supplied in any color. All nitrocellulose materials are supplied by the different manufacturers in heavy liquid form and should be thinned with solvent to the proper consistency before spraying. This is done for the purpose of avoiding settling, and for this reason the primer is supplied ready to apply as it contains only sufficient pigment for a guide coat.

There are as many kinds of lacquer furnished by various manufacturers as there were kinds of varnish and paint material furnished in the old days, and you will secure as widely varied results as you would from the range of varnish materials.

In the use of nitrocellulose materials I would recommend that you secure the materials for the complete system from one manufacturer, so that they are properly engineered, one material with another, as I believe that this is the only way in which you can secure uniform results.

Standard practice for a complete nitrocellulose system is one coat of primer, two or three coats of gun glaze or surfacer and two or three coats of nitrocellulose enamel. On street cars this entire system can be applied in one day. You can secure nitrocellulose materials which are elastic enough so that if you desire they may be var-

*Abstract of paper presented before the C.E.R.A. Master Mechanics Association, Akron, Ohio, Feb. 11, 1926.

nished over. These materials may also be polished to a very high luster if desired.

Without polishing a complete nitrocellulose system can be sprayed on a 45-ft. street car in approximately fourteen hours. If it is desired to sand the surfacer or gun glaze this increases the total time to an average of twenty hours.

Nitrocellulose materials are nonporous and therefore very easily cleaned, as dirt settling on them does not grind in as it does on varnish and oil enamels. The material becomes extremely hard and each time it is cleaned acquires more luster, so that for a period of time the car is getting brighter, while with the varnish type system it is steadily perishing.

Bus Maintenance an Important Part of the Chicago Operation*

BY E. WOOTON
Superintendent of Equipment Chicago Motor Coach Company

NO TWO bus properties can be operated exactly on the same principle, nor can the equipment be maintained in the same manner. I think, however, that the operation and maintenance methods practiced in Chicago can be used as a basis. We operate approximately 420 coaches, which are housed in four different garages, besides the central repair shops where all major repairs and painting are carried out. Garage superintendents are held responsible for the mechanical condition of the equipment in their respective divisions. They report direct to the superintendent of equipment, so that each division is on a competitive basis. Each division superintendent has a clerk who takes care of the clerical work, which consists principally of ready reference records of the equipment, gasoline and oil consumption and individual coach mileages. All reports are sent direct to the chief equipment clerk, who examines and files them in proper order, and at the end of the month makes up various kinds of comparative statements.

All coaches are held in for inspection on a 2,500-mile basis and a garage operating 100 coaches will run approximately 10,000 miles a day, which would represent four inspections per day. Two of these inspections would be held during the morning rush, the other 98 coaches would be scheduled for service. All inspections are completed and coaches scheduled for the afternoon rush.

During these inspections units are examined on a regular routine system, and should any of them be found defective or not considered capable of running until the next inspection the unit is removed and replaced with an overhauled one, the defective unit being returned to the central shops for repairs. The mechanics making the inspection have a complete report of the performance of the coach since its last inspection, therefore if any unit has been giving considerable trouble, this report helps the mechanic to form his conclusions. A complete record of all units is kept at the central repair shops, unit change slips being sent through for all units removed from coaches.

Each garage has an auxiliary stockroom which is supplied daily from the central stores. All parts are carried on a maximum and minimum basis, but not in large quantities. For small parts, the minimum number to be carried is placed in a small canvas bag, so that the storekeeper knows, if he has to take the parts from the bag, that he is down to the minimum and should order replacements immediately. For large parts, the minimum number of pieces is tagged.

The inspection system, like that of all other railway equipment, is very important. It enables us to make up an estimated personnel based on an estimated mileage supplied by the transportation department, which gives a predetermined payroll. It assures that every man employed has something definite to do. He is occupied at all times carrying out work which avoids trouble, rather than waiting for trouble to develop in order to remedy it.

We find in most cases where failures occur that on analyzing the cause it was due to some apparently unimportant part failing first. We know that there are certain parts which deteriorate or wear. We will take, for example, the case of a radiator hose. During inspection the man who is accustomed to doing this work can tell very easily whether this connection is capable of running another 2,500 miles. If he is in doubt he will take it off and replace it with a new one, which will probably cost between 40 and 50 cents. If the old one is allowed to run along and give out on the road it would probably mean a ruined engine, and there are many like examples which apply.

Another feature of inspection is that it insures that all parts, such as universals, wheel bearings, etc., are lubricated at regular and proper intervals, which is very important. Do not neglect inspection of a vehicle which happens to be running perfectly to relieve something else which might be tied up, as this will finally spell disaster.

When a coach is held for inspection its oil and gas averages are referred to, as these are a good indication of the mechanical condition of the vehicle. Each division keeps on file a daily record of the gas and oil consumption of every coach, also the miles per gallon. Fuel and lubrication costs are among the highest items and should be watched constantly, coaches with low averages being given special attention.

When considering garage construction, we figure to allow 350 sq.ft. per coach and to build one inspection pit for every 20 coaches. We are very much in favor, where possible, of using the indirect heating system, which has the advantage of supplying a certain amount of circulation, also supplying the heat underneath the engines, where it is most beneficial in extreme cold weather, and can also be used for ventilating in the summer.

The central repair shops in Chicago are entirely self-contained and are connected directly with the purchasing department and the general stores, which is a great convenience, where such arrangements can be carried out. In these shops we maintain all the units, such as engines, clutches, transmissions, rear axles, etc. Schedules are arranged to bring all coaches through the shop once a year, the major work being replacement of panels, painting, etc.. Very little mechanical work is done, since our inspection system at the garages takes care of this work. We feel this is very much more economical than the old system of dismantling the chassis completely once a year, since there are no two units which have the same length of life. By using our present system we obtain the maximum mileage out of each unit before it is repaired.

We employ approximately 100 men at the central shops, which is about one man for each four coaches owned. In figuring space for the central repair shops we feel that about 100 sq.ft. for each coach owned is sufficient.

Through the courtesy of the North East Company, I have been able to obtain the services of D. P. Cartwright, with two of the company's films which

*Abstract of paper presented before the C.E.R.A. Master Mechanics Association, Akron, Ohio, Feb. 11, 1926.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

Feb. 25—New England Street Railway Club, Copley Plaza Hotel, Boston, Mass.

March 5 — Metropolitan Section, A.E.R.A., 29 West 39th Street, New York, N. Y.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11 — Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12 — Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

Oct. 4-8—American Electric Railway Association, annual convention, location not yet determined.

give some of the elementary principles of the functioning of the gasoline engine and its electrical equipment. These explain several important points.

We have three different classes of motor coach operation, city service, interurban service and long-distance service, each of which is in a class by itself. Since my experience has mostly been in city service, I would strongly recommend that the equipment be constructed with independent units, such as engine, transmission, rear axle, etc., and that these units be built in such a manner that they can be removed quite readily without any undue mechanical work. This is of vital importance in order to keep down the maintenance cost and keep the coaches in revenue service.

American Association News

Uniform Dimensions for Cars Proposed

CONSIDERATION of uniform dimensions for cars was given by the manufacturers' engineering committee in a three-day session at association headquarters, New York, Feb. 15-17. A joint meeting with the committee on unification of car design was held on Tuesday. Those present at the meeting were G. C. Hecker, chairman of the manufacturers' committee, together with J. A. Brooks, C. A. Burleson, and W. J. Clardy; H. H. Adams, chairman of the committee on unification of car design, with the following members: L. J. Davis, H. F. Flowers, C. Gordon, J. W. Hulme, G. L. Kippenberger, C. W. Squier and V. Willoughby. J. A. Brooks of the manufacturers' committee is also a member of this committee.

After a careful study of various car designs submitted by car manufacturers, together with a review of weight, seating capacity, fundamental dimensions and salient features of cars purchased during the last five years, the manufacturers' committee has prepared four drawings embodying dimensions and features which it considered suitable to the requirements of average size city or interurban properties throughout the country.

It was the consensus of opinion that car and electric manufacturers, by agreeing on the general sizes, weights and arrangement of the cars suggested, would be in position to offer to the industry cars of essentially uniform type suited to meet the requirements of the average city or interurban operating conditions. It was thought that such general uniformity would not limit the application of individual initiative in the further development of appearance and structural details that would place each manufacturer's stamp of individuality on his product. The urge of competition, it was felt, would bring about the improvement and development of cars considered necessary from the standpoint of competition with other forms of transportation. The fundamental problem was held to be the construction of cars that would attract patronage and reduce operating cost. Second only to this in importance, it was felt, is that greater uniformity in basic dimensions could be brought about and would result in reducing both the first cost and maintenance cost of equipment.

In discussing the advantages of a general agreement among car builders and electrical manufacturers as to the proper sizes and weights of cars for average city conditions, emphasis was laid on the fact that such general agreement was eliminating much of the present confusion regarding the type of car best suited for service in a given city, particularly on the smaller properties.

For city service, the committee proposed a light weight double truck car arranged for four motors. Drawings of cars for double end and single end operation have been prepared, that for single end operation differing from the other only in the platform arrangement at one end. The car for double end operation is similar to that shown in the 1922 report of the committee on unification of car design with bodies having 10, 11 and 12 windows. The committee recommends arch type roof construction, tapered flush platforms, with a single folding step. The first step is 15 in. and the second 14 in. high. The height from the bottom of the sill over the roof boards is 8 ft. 10½ in., the over-all width 8 ft. 4 in. post centers 29½ in., aisle width 27 in., seat length 35 in. and wheel diameters 26 in.

These cars, with four 25-hp. motors and double end platform type control, together with all safety features, should have a maximum weight not exceeding 32,000 lb. The maximum weight with 35 hp. motors and double end train control with all safety features should not exceed 37,000 lb. In considering weight, the committee felt that in most cases these maximum weights would be materially reduced in cars as constructed.

The truck centers for the ten-window car is to be 16 ft. 6½ in.; for the 11-window car, 19 ft., and for the 12-window car, 21 ft. 5½ in. The wheelbase will vary from 4 ft. 10 in. to 5 ft. 4 in.

Drawings for light weight interurban cars for double end and single end operation similar to that for city service were also considered. These cars will be made for lengths requiring 10, 11 and 12 windows. Provision is made for a smoking compartment, the size of which can be varied by moving the partition a full window length or more. A lavatory can also be incorporated, occupying one or two windows. Other details agreed upon were a plain arch roof, straight flush platforms, with first step 15 in. and second step 14 in., height from bottom sill over roof, 8 ft. 10½ in., over-all width 8 ft. 6 in., post centers 33 in., aisle width 24 in., seat length 35 in., wheel diameter 26 in., length of platform 5 ft. 4 in. The design submitted had sliding doors and stationary steps, but the cars can be equipped with the folding doors and steps without radical changes in the design. Cross seats are provided, with longitudinal seats at the end seating two passengers each.

The interurban cars with four 25 hp. motors and platform control for single unit operation should have a weight not to exceed 30,000 lb. The maximum weight with 35 hp. motors and double end train control should not exceed 37,000 lb.

The committee has also given careful consideration to other types of city cars. It found that the trend of car purchases as shown by the statistical numbers of ELECTRIC RAILWAY JOURNAL show that the single truck car is being bought in decreasing quantities, and that the double truck, one-man, two-man car has become increasingly popular. The committee found that as far as the single truck car is concerned, practically every car builder is prepared to build the standard Birney car or a modified Birney car and they consider that little would be gained by attempting recommendations for a new type of single truck car.

Cars with both center and end doors were discussed by the committee, which brought out the fact that such cars are used on relatively few properties and most of these are large ones. It was also found that in each instance this type of car was designed particularly to meet certain local conditions and that there was practically no uniformity in design adopted by the different properties using them. The decision of the committee was that no single design of center and end door cars could be produced which would meet the requirements of the different properties desiring to use such a car. It was therefore agreed that the committee would not attempt to submit a design for this type of car.

Metropolitan Section Reviews Steel Industry

A TALK on the steel industry, illustrated by six reels of motion pictures, was delivered by George A. Richardson, manager of the technical division Bethlehem Steel Corporation, before the Metropolitan Section of the American Electric Railway Association. The meeting was held on Jan. 5 in the Engineering Societies Building, New York City.

Before the main speaker of the evening. R. F. Carbutt, railway engineer H. L. Doherty & Company, gave a brief report of the Central Electric Railway Association meeting held on Jan. 27 and 28 in Indianapolis. John A. Dewhurst, associate editor of ELECTRIC RAILWAY JOURNAL, also gave a report of the New York Electric Railway Association meeting held at the same time in the Hotel Commodore, New York. A clear note of optimism and a better understanding of the basic problems that have developed was the underlying thought of both meetings.

Despite the severe weather experienced, the membership list has constantly increased from 1,122 reported at the last meeting to 1,168 reported at the meeting of Feb. 5.

The News of the Industry

Fare Question Up

Adjournment Follows Hearing Before Commission on Application for Higher Fare in Utica

Following the introduction of several exhibits setting forth the financial condition of the New York State Railways, Utica lines, and purporting to show the deficits sustained under a 7-cent fare, the railway rested its case on Feb. 17 in its petition to the Public Service Commission for permission to charge a 10-cent cash fare with provision for the sale of ten tickets for 75 cents. An adjournment was taken to March 10 to permit the city to examine the figures presented by the company and to prepare its case in opposition to an increased fare.

COMPANY READY TO CO-OPERATE

Clarence M. Williams, corporation counsel of Utica, announced to the commission that the city had retained Dr. Milo R. Maltbie to aid in the city's case. Mr. Williams asked permission of the company to have Dr. Maltbie examine the books to check the figures, but such consent was refused on the ground that it would delay the proceedings. The company through its counsel, Warnick J. Kernan, promised to supply the city with any information it desired, and Chairman W. A. Prendergast of the commission told Mr. Williams that the commission's accountants were now examining the company's books. Chairman Prendergast said that the full results of the commission's examination would be available to the city.

The valuation claimed for the Utica lines as of Oct. 1, 1925, by the company is fixed at $10,726,427. The company estimated that the proposed fare would yield an additional revenue per year of $96,403. This estimate was arrived at by using the number of revenue passengers carried in 1925, amounting to 16,000,229, and deducting 5 per cent for possible loss in patronage because of the increased fare. Of the 15,200,218 passengers remaining, it was estimated that 20 per cent would pay the 10-cent fare, giving a return of $304,004, and that 80 per cent would use the token fare, giving a return of $912,013. This would yield a revenue of $1,216,017.

EIGHT PER CENT NOT EARNED

The company, through exhibits prepared and sworn to by J. N. Joel, general auditor, claimed that in 1923, 1924 and 1925 it fell considerably short of earning an 8 per cent return on its investment. It alleges that it failed to earn a fair return even on the rate base fixed by the commission, which it contends was far too low, and claims that the earnings would return only about 2 per cent on the present fair value claimed by the company. It was claimed that the earnings fell $32,074 short of earning an 8 per cent return on the commission's rate base in 1923, $105,203 short in 1924 and $102,765 short in 1925.

Mr. Williams stated for the city that he would reserve any rights he might have to question jurisdiction of the commission to hear the increased fare petition. In 1922 a special term of the Supreme Court denied the city a writ of prohibition, but Mr. Williams said that he was not satisfied the decision of the special term was in accord with recent decisions of the courts on the question of jurisdiction of the commission where there are fare restrictions in the franchises of railway companies.

Baltimore Commission Approves Traffic Changes

A definite plan for the rerouting of cars of the United Railways & Electric Company, Baltimore, was adopted by the Baltimore Traffic Survey Commission at a meeting on Feb. 10. The plan approved by the commission is a combination of several lists of proposed changes. It was approved as the plan best suited for all concerned. The next step to be taken is the filing of a detailed report of the changes with the Maryland Public Service Commission. Public hearings will be held and the traffic body will be called upon to show why the changes should be made. It is said that the approval of the United Railways depends upon further action on the part of the commission. In this connection it is pointed out that if cars are ordered off one street and placed on another other traffic should be regulated to take care of the changes. The commission has still to report on vehicular and pedestrian traffic. A report covering these subjects is expected to be completed in March.

One of the most important features of the plan approved by the traffic commission is the removal of all cars from the downtown section of Lexington Street. The other features include the removal of all but one line from Charles Street, removal of one-man cars from the Halethorpe line and other reroutings.

The Baltimore Traffic Commission adopted the proposed changes after an exhaustive survey made by Kelker, De Leuw & Company, Chicago. The cost of the survey is being met by city, state and the United Railways. It was brought about as a result of suggestions that were made at the time the hearings were in progress that were held before the Public Service Commission to fix the valuation of the United's property. Mr. Miles is chairman of the commission.

Fare Plea in Binghamton

Seven-Cent Fare Continued Pending Settlement—Old Dispute On Over Franchise Restrictions

The temporary continuance of the 7-cent fare in Binghamton, N. Y., on the lines of the Binghamton Railway was recently authorized by the Public Service Commission pending a final decision as to the merits of the company's application. As a result a controversy of long standing is waging anew in which the city, the commission, the railway and the courts play prominent parts. On Jan. 30 the city filed a notice of appeal to the Court of Appeals from the decision of the Appellate Division.

The issue goes back to 1919, when the former receiver applied to the old Public Service Commission for an increase in fare from 5 to 6 cents. The city of Binghamton questioned the jurisdiction of the commission on the ground that there were restrictions in the franchises which limited the fare to 5 cents, but the commission overruled the city's objections. The city then applied to the Supreme Court of the State of New York for a writ of prohibition restraining the commission from granting a rate of fare in excess of 5 cents and restraining the receiver from charging a fare in excess of 5 cents. The writ was finally granted and entered on Dec. 17, 1919.

The receiver immediately took an appeal to the Appellate Division of the Supreme Court, but early in 1920, before the appeal could be argued, the Common Council of the city of Binghamton adopted an ordinance authorizing the receiver to collect a 6-cent fare for a period of two years. This ordinance contained a provision which precluded the receiver or the company from prosecuting its appeal while the ordinance was effective. Similar ordinances were subsequently granted covering the years 1923 and 1924.

In 1925 the Common Council of the city granted an ordinance consenting to a 7-cent fare for a period expiring Jan. 15, 1926. This ordinance contained no provision prohibiting the company from prosecuting the appeal from the order granting the writ of prohibition. The appeal came up for argument at the May, 1925, term of the Appellate Division, and a decision was rendered reversing the decision of the lower court and authorizing the prosecution of the original application to the Public Service Commission. The decision of the Appellate Division was based largely upon the ground that the restrictive provisions of the old franchises were intended to apply only to horse cars, and that when the horse car lines became electrified the 5-cent fare limitations contained in the old franchises became ineffective.

Upon the adoption by the Common

Council of the city of each of the ordinances mentioned consenting to a fare in excess of 5 cents for a stated period an order was procured from the Supreme Court holding the writ of prohibition in abeyance for the period covered by the ordinance. An application was then made to the commission for permission to charge the fare permitted by the ordinance for such period. On Jan. 15, 1926, the authorization expired which had been passed early in 1925 by the commission to charge a 7-cent fare under the ordinance.

In view of the decision of the Appellate Division holding that franchises did not limit the rate of fare which might be charged, the company filed with the commission in December, 1925, an application to continue the 7-cent fare beyond Jan. 15, 1926, without asking for any consent from the city. The commission on Jan. 15 granted its temporary order.

Ten Cents in East St. Louis

The East St. Louis Railway, acting under a federal injunction restraining the Illinois Commerce Commission from interfering, advanced the basic fare in East St. Louis, Ill., from 8 cents cash to 10 cents on single fares, effective Feb. 14. The new schedule means single cash fares of 10 cents or five tokens for 40 cents. The old scale was 8 cents for single cash fares or two tokens for 15 cents. The interstate fare between St. Louis, Mo., and East St. Louis and to points beyond East St. Louis will not be affected by the change in the East St. Louis city fares for the present.

The railway took the matter before the federal court after the Illinois Commerce Commission had twice suspended action on the company's petition for increased fares. The company contended that the failure of the state body to take some action on the petition for increased fares was in violation of the United States Constitution. The petition was passed on by Federal Judges Page, Lindley and Evans and the injunction was granted by them on Feb. 5 at Danville, Ill.

The application for increased fares in East St. Louis was first presented to the state commission almost a year ago and final testimony in the case was heard in October.

$5,000,000 Program Awaits Cleveland Council's Action

John J. Stanley, president of the Cleveland Railway, Cleveland, Ohio, says that as soon as the amendments which have been suggested to the Tayler franchise are adopted he immediately will call for the sale of a large block of new Cleveland Railway stock to finance the first portion of the improvements.

The changes are very simple. It is intended to provide a wider range of fare limits to meet contingencies created by unusually expensive operating periods, to increase the interest fund from $500,000 to $1,100,000, and to set up a sinking fund for capital retirement.

The first offer will be to stockholders as usual. But if this fails to provide all the capital needed the amendments make it possible to offer the stock on the open market with a two point discount to encourage salesmanship on the part of banks and bond houses.

First call for stock subscriptions in the improvement program may run as high as $3,000,000, if present shareholders of the company subscribe as much as 10 per cent of their present holdings, and this probably will cover all the work that can be accomplished in 1926.

Here are some of the items in the improvement program:

Four new carhouses, one of the first being a new plant to replace the antiquated Cedar Avenue carhouse.

Rail extensions on Pearl Road to the city limits.

Bus extensions in all outlying parts of the city and the suburbs.

Purchase of at least 100 new cars and as many additional buses.

Beginnings on various new short cuts and private rights of way to speed up service on many congested lines.

Development of multiple-unit train service on heavy main lines.

Experiments with buses and street cars in various rapid transit combinations for express and local service.

The amendments are substantially those proposed last June by the metropolitan transportation commission.

Bay Cities Agitated Over Fare Increases

Recent Increases in Rates Authorized by Commission Result in Hatching of Fantastic Bus-Ferry Scheme—Oakland Commissioner Suggests Survey of Entire East Bay Problem

SHARP attacks are being directed at the California Railroad Commission by clubs and civic organizations of the East Bay as the result of a series of recent decisions raising rates on the Key System Transit Company's lines and ferry and the Southern Pacific ferry and denying the application of a new ferry company which wished to operate between Berkeley and San Francisco.

Berkeley is taking a leading part in the fight, because that city is very much interested in getting the new ferry for autos and pedestrians. Despite the inadvisability of provoking a ferry rate war and with it lower fares, this seems actually to have been the desire of some of the protestants.

The Railroad Commission found, however, that there is no present need for the new ferry, because the public is already adequately served by two competing lines. The commission found further that the new ferry would not lower rates, because the rate schedule filed with the franchise application was higher than on those of the competing lines. This decision, coming on the heels of two denials of rate rehearings requested by Berkeley and Oakland, stirred a storm of protest.

A. O. Stewart, president of the Golden Gate Ferry Company, denied a certificate by the commission, has asked for a rehearing. In the meantime he has suggested to Mayor John L. Davie of Oakland that Oakland and the ferry company go into partnership in a bus-ferry combination, the city of Oakland to finance a bus service to the waterfront and his company to run a ferry service to San Francisco from Oakland. This plan is now being considered by various civic bodies and may be put on the ballot at the next election.

In the meantime the higher rates are in effect on the Key and Southern Pacific ferries and the Key traction system. The Key got its increases as "emergency measures," following a higher wage award to carmen by an arbitration commission. Then, after this raise had been granted, the Southern Pacific requested a separate hearing, at which it demanded higher rates to jibe with those on its rival, the Key system. New rates for the Southern Pacific were approved by the commission and went into effect on Jan. 25.

Officials of Oakland and other East Bay municipalities attended these rate hearings and presented their side of the case. Their contentions were overruled and the increases granted by the commissioners, after due deliberation. Then followed a series of rehearing petitions, all of which were denied.

The plan hatched at Oakland to vote on a municipal bus proposition at the next election has many backers, among them the Mayor and at least one city commissioner. Whether the suggestion would appeal to two-thirds of the votes is doubtful. Taxes are high in Oakland. They went up last fall. Sentiment favors their reduction. A million dollar bus bond issue, such as has been proposed, would undoubtedly raise taxes, and for this reason many would vote against it. The same thing applies to Berkeley and Alameda, which would probably be asked to aid the bond issue. Berkeley is conservative. A municipal bond issue for buses would be unlikely to receive even a majority in that city. Alameda is small and its vote would be unimportant, so far as the general result is concerned.

City Commissioner Frank Colbourn of Oakland has suggested that a survey be undertaken at once of the entire East Bay transportation problem.

Monorail Discussion Revived at Detroit

Discussion of the construction of an elevated monorail system at Detroit has been revived, and a new request of the Michigan Elevated Railway to construct an experimental system has been taken under advisement by the Detroit City Council. Representatives of the company, members of the Detroit Rapid Transit Commission and of the Department of Street Railways were present at a recent hearing at which the proponents of the elevated system stated that the company was prepared to finance the undertaking without assistance. It was also proposed to furnish an indemnity bond insuring the city against expenses and accidents.

Similar requests have been received by the City Council during the past several years and an adverse report was referred to which was made by the Rapid Transit Commission after it had studied the proposed system.

Seven Cents Sought in Elkhart

The Chicago, South Bend & Northern Indiana Railway applied to the Indiana Public Service Commission on Feb. 8 for authority to increase the cash fare on its Elkhart city lines from 5 to 7 cents and to sell tickets at the rate of four for 25 cents. The company sets forth that after the payment of its operating expenses, taxes and paving assessments for 1925 there was a deficit of $10,466 without making allowance for any return on money invested in the local system.

The company says, indicative of the necessity for the rate increase, that since the year 1916 the taxes on its property in Elkhart have increased 141 per cent; that since that year the cost of labor has increased approximately 100 per cent, and cost of material used in the maintenance and operation had increased approximately 85 per cent, that the cost of operating and furnishing that city service had increased approximately 100 per cent, and that in 1925 the railway suffered a decrease of $4,066 in its revenue from the street raliway lines compared with its average revenues for the period from 1921 to 1925 inclusive.

R. R. Smith, vice-president and general manager, said the company was forced to face the fact that it was impossible to continue longer the 5-cent fare in Elkhart. It was hoped the cost of operation would so recede that it could feel justified in continuing the 5-cent fare, but there seemed no likelihood of any recession in prices which would make that possible. He said the increase in the use of the automobile and the bus had seriously affected the earnings of the interurban line. The company published an advertisement explaining the situation.

Increase in Pay for Detroit Shopmen

A flat increase in wage of 5 cents an hour has been granted by the Street Railway Commission in Detroit to about 325 employees of the department's Highland Park shops. The men had asked an increase of 10 cents an hour, free transportation and a week's vacation annually with pay. The requests for free transportation and vacations were denied and the 5-cent increase was granted to the employees. The new scale included those who formerly received 80 cents an hour and those who received less than that rate but had been in the employ of the department two years or more.

A few weeks ago it was announced to the men that they would be permitted to work Saturday afternoons at the old rate of pay, but this arrangement was not satisfactory to them. They wanted an increased wage rate rather than a longer week with its increased amount. Only a few men took advantage of the opportunity at that time. The later recommendation of the general manager of the department that the men be allowed to work Saturday afternoons from Oct. 15 to April 15, if they wish, was adopted by the Street Railway Commission.

New Railway Line for Toronto's Suburbs

A joyous occasion was the opening some time ago of the Weston-Mount Dennis Street Railway under the supervision of the Toronto Transportation Commission, Toronto, Ont. Official ceremonies, followed by a parade, elaborate floats and congratulatory speechmaking, marked the happy day which brought the suburbs of York, Weston and Mount Dennis nearer the realization that some day they will be part of Toronto. The only lugubrious feature of the celebration was the carrying of the corpse of the old Toronto Suburban Railway, which formerly supplied service to these townships.

One hundred and fifty vehicles were in the parade. The line of march was through Mount Dennis to the northern limits of Weston, returning to the boundary line between Weston and York Township, where the official opening was held. A conspicuous part of the parade was on old horse-drawn car labeled "In Service Before 1891." Driving this was James Scott, who has served 33 years with the railway. After the old car came three of the modern red cars of the Toronto Transportation Commission carrying officials.

George S. Henry, Provincial Minister of Public Works, was the first speaker. He said that the occasion marked the passing of another milestone by the metropolitan suburbs of the city of Toronto. The fact that the Toronto Transportation Commission had undertaken to operate the transportation facilities showed the interest the city was taking in the suburbs. P. W. Ellis, chairman of the Toronto Transportation Commission, assured the people that the time would come when they would be part of Toronto. He said: "If a private concern were to take over the transportation it would lose money. But you are a good municipality and have fine borrowing powers. The agreement is fair to both sides."

Continuation Transfers in Irvington Not Needed

Issuance of continuation tickets by the Public Service Railway, Newark, N. J., from short route cars on Springfield Avenue to through cars has been held unnecessary by the New Jersey Board of Public Utility Commissioners. The town of Irvington sought to compel the company to grant continuation transfers without charge. It alleged that a person boarding a westbound car downtown after riding through two fare zones as far as Elmwood loop and desiring to reach a point west thereof would have to alight and pay an additional 5 cents to reach his destination.

The railway said that fare zones had been laid out in accordance with a plan intended to apply to the entire district and that to issue continuation slips would establish a precedent, cause undue hardship to one-man car operations and burden the company financially. It offered in evidence traffic checks to show that between 6 a.m. and midnight on a typical day 190 passengers arrived at the loop on 123 westbound car trips, but that only 24 transferred at this point to through cars.

$10,000,000 for Rolling Stock Suggested for Detroit

Within the next three or four years the Department of Street Railways at Detroit, Mich., should spend approximately $10,000,000 on new equipment and repairs to present equipment. H. U. Wallace, general manager, made this statement before members of the North End Progressive Business Men's Association on Feb. 16. This sum, Mr. Wallace said, could be paid from the earnings of the system without increasing the fare. At least 150 cars are obsolete and should be replaced soon. He said:

> These 150 cars outlived their usefulness long ago. They cannot be repaired and we are forced to keep them in service because we have no others to replace them. There are cars that should be scrapped or rebuilt, and others that should be repaired at once, about 750 in all.
>
> Even the Peter Witt cars are obsolete in some respects. They lack certain safety appliances which I consider essential, and the seats and floors should be changed. The seats are too hard and uncomfortable. We have found that leather upholstered seats have twice the durability of cane upholstered seats.
>
> As for the change in the manner of building floors, the new specifications for street cars call for battleship linoleum floors. These are easier to clean than the present wood slat floors, they add warmth to the cars, they have a better appearance, and they afford better footing for passengers in wet weather.
>
> It would not, however, be necessary to scrap these cars. They could be rebuilt and repaired.

An Exhibit that Appeared in the Line of March at Toronto

Wage Agreement in Cedar Rapids

Negotiations over the wage scale of railway operators employed by the Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, came to an end recently when the carmen agreed to renew a trial agreement of six months ending July 1, 1926. On that date they will get an increase of 2½ cents an hour, providing the company's revenues come up to the estimates made last summer in the city audit. If the increase is granted, it will be retroactive to Jan. 1, 1926. A similar agreement was made last July, but the company opened its books to show that business had not been as expected when higher fares were granted by the city and when the men were given one raise of 2½ cents last summer. The top scale is 52½ cents an hour for the carmen.

Pension Plan Under Consideration in Portland

At the annual banquet of the "Twenty-Year Club" of the Portland Electric Power Company, Portland, Ore., it was found that twelve of those present, including President Griffith, belong to the still more exclusive group known informally as the "30-year men." The combined years of service of the 278 members aggregate 6,661 years, and more than 50 new members have been added during the past year. The first woman to be admitted is Miss Annie I. Warnock, since 1906 assistant paymaster of the company. In two instances father and son are represented in the club, each having been with the company for 25 years.

Official announcement was made at the meeting by Franklin T. Griffith, president, that a general plan for an employees' pension system was under consideration by the company.

Philadelphia Will Not Appeal Fare Decision

City Solicitor Gaffney of Philadelphia, Pa., declared on Feb. 9 that no appeal would be taken by the city in the Philadelphia Rapid Transit Company fare case, in accordance with instructions received from Mayor Kendrick.

Mr. Gaffney said the city in its attack upon increased fares had for its objective the reduction of the company's operating expenses. He said that in a printed brief it had got together testimony in support of a drive principally against the amount of $8,560,400 set up each year since 1921 for maintenance and renewals, the 77 cents an hour wage payment and the federal income and other taxes.

The commission rejected the city's contention relative to the first two items and found in favor of the company. The reasoning of the commission in support of its findings, he said, had not shaken the conviction of the city in the soundness of its own contention. He referred to the case of the City of Scranton vs. the Public Service Commission, in which the city of Scranton appealed the decision of the commission. Mr. Gaffney quoted in part what Judge Porter said in this case: "We are of opinion, after mature consideration, that we are without authority to set aside a finding of fact by the Public Service Commission which is supported by substantial evidence where no constitutional question is involved." Mr. Gaffney said that that case had been followed and approved in a number of later cases.

The United Business Men's Association, which was a protestant in the fare case, has decided that it would not appeal the decision of the Public Service Commission in upholding the Philadelphia Rapid Transit Company's petition for maintenance of the 7½-cent fare.

Suburban Passenger Report at New York Due Soon

Governor Smith of New York has signed the Webb bill as Chapter 2 of the laws of 1926, extending to March 15, 1926, the time in which the commission created in 1925 to investigate and report upon the suburban passenger transportation problem of the city of New York must report to the Legislature.

Waukesha-Milwaukee Franchise Approved

The public utilities committee of the Common Council of Milwaukee, Wis., recently approved the application of the Milwaukee Electric Railway & Light Company for a franchise to operate the new Waukesha-Milwaukee high-speed electric line. A dispute was in progress for some time between the company and the City Council over the legality of this new high-speed line. After the company had secured a certificate of convenience and necessity from the commission, the city said that a franchise was necessary in view of the fact that the line would block numerous streets in the city. The company argued that the new line was in reality an extension of the present Clybourn Street line, and would be entitled to operate under the franchise granted in 1910. The company has not yet signified whether it will accept the grant.

Reorganized Company in Ohio Resumes Operations

The Nelsonville-Athens Electric Railway started operations on Feb. 8 between Nelsonville and Athens, Ohio. This is the new company which grew out of the reorganization following the abandonment of the Hocking-Sunday Creek Traction Company. This line had been in receiver's hands for months and was out of operation for weeks. It was sold late last year to E. B. Young, former general manager of the company, for $41,500. At that time the bondholders purchased the railway through Mr. Young, who said that he would resume operation of the system.

The company will operate a bus line as an auxiliary to the traction line. Buses will meet each interurban car and operate over a scheduled route in the city of Athens, Ohio, thereby giving hourly service over the principal streets of the city.

Service in Syracuse Explained

Education of the public to a realization of the company's imperative need of greater revenue by an increase in fares in Syracuse, N. Y., has been undertaken by the New York State Railways. The company has a petition before the Public Service Commission asking for a 10-cent cash fare rate and a rate of 7½ cents for ticket riders.

The advertising campaign which the company is promoting consists of a series of statements designed to arouse interest in the public utility.

One of the advertisements consisted of a condensed financial statement for the three years ended Sept. 30, 1923, 1924 and 1925. In 1923 the company had a shortage of $404,013. In 1924 it was $387,522, and for 1925 $388,543. One of the advertisements says in part: "A shortage of $1,180,079.42 in three years. How would you like to run a business that couldn't make a reasonable profit? In the face of these figures we believe that you will agree that your trolley company is giving far more than ordinary public service." In other statements the company has explained its business in detail, what the cost of public improvements meant, how much it cost to maintain service, how much of the fare goes for wages, and other pertinent questions.

Tired of Playing Tacoma Mayor's Game

The Puget Transportation Company, operating buses in Tacoma in competition with the lines of the Tacoma Railway & Power Company, at a recent meeting of its board of trustees, defied Mayor A. V. Fawcett to make good his reported threat to revoke the bus permits issued the company. The action is a step in the quarrel between the Mayor and the bus company, declared by company officials to be a political move on the Mayor's part. George Vandeveer, attorney for the company, charges the Mayor with a plan to purchase the Tacoma railway for the city and of using the company as a club to beat down the price of the street railway system. The trustees of the bus company state they will continue to operate the buses as long as it is possible, in the hope of salvaging something for the stockholders.

Utah Association Does Work of Mercy

The Traction and Power Mutual Aid Association, a body composed of employees of the Utah Light & Traction Company, the Utah Power & Light Company, Phoenix Utility Company and Western Colorado Power Company, held its annual meeting on Dec. 16, 1925, at Salt Lake City and elected officers for the ensuing year. The secretary's report showed that the association paid death claims of $6,000 during the year 1925, and for sickness, accidents and service refunds the sum of $4,656. A surplus of $14,303 was divided among the members in the usual form of a Christmas dividend of $15 each for twelve months membership and fractional time at the same ratio, 979 members participating in this.

Interurban Station Ordinance at Kansas City to Be Rescinded

At a meeting of the City Council of Kansas City, Mo., on Feb. 8 an ordinance was introduced into the lower house of that body with a view to repealing the franchise of the Central Interurban Station Company. The repeal ordinance was referred to the conference committee.

The original franchise, granted on Jan. 9, 1918, provided for a union interurban station at the northeast corner of Tenth and McGee Streets. The building was to have been a combined station and office building to cost $3,000,000.

Work on the proposed structure was to have been started by the station company within one year of the granting of the franchise. Two of the interurban companies which were to have participated in the plan met later with financial difficulties and the Kansas City Railways was placed in receivership. Officials of the terminal company secured two extensions of the time limit passed by the city fathers, but continued financial obstacles and the advent of many bus services, both in the city and between it and other cities in this vicinity, gradually caused the dream of the central interurban station to fade almost beyond recall.

In an interview several month ago, C. C. Peters, president of the company, admitted the improbability of the project's ultimate consummation, due to the much-altered general conditions in this section since the World War.

A part of the ground which was to have been the site of the station has been leased by the company during the last several months for a parking station, at an annual rental said to be little more than enough to pay the taxes and interest on the realty. No announcement has been made of plans for selling the property, in the event the franchise is repealed.

Rhode Island Railway Seeks Market for Surplus Power

In a bill filed with the Rhode Island Legislature authorization is asked for the incorporation of the United Electric Power Company at a nominal capitalization of $100,000. According to the petition, the new corporation would take over the power house and transmission lines of the United Electric Railways, Providence, and provide for the power requirements of electric railways, lighting, transmission and manufacturing purposes. The incorporators are Albert E. Potter, president of the United Electric Railways; Zenas W. Bliss, George H. Newhall, Harvey A. Baker, Ralph S. Richards, Edward B. Aldrich, J. Cuncliffe Bullock and Harold J. Gross, all directors of the United Electric Railways.

Bond Legislation Likely in New York

It seems likely that the Legislature will pass at the present session an amendment to the Constitution giving to New York City an exemption from its debt limit of $300,000,000 which may be raised by bonds for the building and equipment of subways. The original proposition was for an exemption of $275,000,000, but the legislative leaders are inclined to go a step further and give an additional $25,000,000 exemption. The measure will have to be repassed by the Legislature of 1927. It can then be submitted to the people and the money made available under its provisions for construction work in 1928.

Increase in Fare Sought in Albany

The United Traction Company, serving the cities of Albany, Troy, Watervliet, Rensselaer and Cohoes, N. Y., has filed application with the Public Service Commission to increase its fare from 7 to 10 cents, with the sale of thirteen tickets for $1. Hearing on the application will be announced at an early date.

Discussion of New Franchise in Richmond, Va., Renewed

Negotiations are being conducted between the City Council in Richmond, Va., and the Virginia Electric & Power Company for a blanket franchise covering all of the lines operated by that company. Some of the franchises which the company now has it considers perpetual. Others run to 1940. One expired on Jan. 1. It is the purpose of the company and the city to try to draft in conference a complete franchise satisfactory to both. One objection to some of the present franchises is that they specify the routes. Some also specify the headway. These conditions have prevented the company from improving the service as much as it otherwise might have been able to do. If the new franchise goes through, the company will probably reroute its cars down town and extend some of its rail and bus lines.

The law requires new franchises to be offered at public auction, but it does not require the city to accept the highest bid. The city is permitted to accept the bid it considers best for the city from every point of view.

News Notes

Will Rehear Fare Application.—The Pacific Electric Railway has been granted a rehearing by the Railroad Commission on its application for an increase in railway and motor coach fares in the city of Pasadena, Cal. The rehearing will be held before Commissioner Seavey in the court room of the commission at Los Angeles on March 16.

Pass System in Effect.—The Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont., started selling the first of the year a weekly pass for 75 cents.

One Day Off Bill Reappears.—Under the provisions of a bill introduced in the New York Senate by James L. Whitley, Republican, of Rochester, in which city the traction and bus company are operating under a service-at-cost-plus plan, the railroad law is amended to require operators of street surface railroads, trackless trolley or omnibus lines in cities or villages to give employees one day of rest in seven.

New Paper Appears.—The Jacksonville Traction Company, Jacksonville, Fla., started recently the publication of a pamphlet called the "Palm Leaf." It is to be issued every month for the benefit and entertainment of the employees. E. Q. Brown is editor.

Change in Name Desired.—At a recent special meeting held in Cleveland the directors of the Northern Ohio Traction & Light Company, Akron, Ohio, voted to change the name of the company to the Northern Ohio Power & Light Company. The action must be ratified by stockholders and a special meeting to act on the recommendation has been called for March 15.

Wages in Spokane Increased.—J. E. E. Royer, assistant general manager of the Spokane United Railways, Spokane, Wash., recently announced that an increase of pay for 218 railway men had been granted by the company to date from Feb. 1. The plan of the company to increase the pay of its street railway operating force came out in the hearing of the street car fare increase at Olympia, when officials of the company testified that $26,000 had been set aside for that purpose in the 1926 budget, or approximately $10 per month per man on an average. Mr. Royer said that the men were entitled to share in the fare increase; that the public had accepted the increase without protest and it was well that it should know that the men are to get a share of the slight addition to the fare. The fare settlement has been referred to in these pages.

Ten Cents in Belleville Allowed.—Efforts of City Attorney L. N. Perrin of Belleville, Ill., to prevent the East St. Louis & Suburban Railway from collecting a 10-cent fare on its cars in Belleville failed on Feb. 9 when United States Judge Lindsey in Chicago overruled a motion of the city for a modification of an injunction granted to the company several years ago. The injunction restrains the Illinois Commerce Commission from interfering with the rate charged by the company. The state commission was restrained on the grounds that the restrictions placed by the commission were confiscatory and in violation of the constitutional rights of the company. On Jan. 24 the fare in Belleville was advanced from 7 cents to 10 cents over the protest of the city officials. The city had sought to reopen the injunction case on the ground that the character of the company's business had changed since the granting of the injunction due to an extension of the Belleville city limits.

Refuses Request for Terminal.—The City Commission of Trenton, N. J., has refused the request of the Public Service Railway to establish a trolley terminal at Liberty and Adeline Streets to relieve traffic conditions at State and Warren Streets, more than a mile away. The refusal of the commission was based on the likelihood that traffic would become congested at the proposed new terminal.

Recent Bus Developments

Irresponsible Bus Operators in Massachusetts Must Go

Acting under the new law of 1925, which gives it jurisdiction over buses, the Massachusetts Department of Public Utilities has prepared a tentative draft of rules and regulations which will cover all the operations of the passenger-carrying buses in the state. This draft will be submitted to the interested parties for suggestions and criticisms and a public hearing on it will be given at the State House on Feb. 24. In brief, the commission takes control over the licensing of the buses, will require the filing and publishing of rates, will prescribe definite routes for all buses and will require a timetable, just as is done in the case of railroads and electric railways.

Every owner of a bus or buses to be operated in the public ways in Massachusetts, and doing an intrastate business either in whole or in part, will be required to obtain licenses and meet the bond and other requirements of each city and town in which they operate. A permit from the Division of Highways and a certificate of public convenience from the Department of Public Utilities will also be required.

The schedules to be filed must show the regular starting time, the time for passing certain points en route and the time of arrival at the terminal, and the rules say that no schedule shall be provided or maintained which will require unsafe and unreasonable speed. The rules will hold the buses to the schedules and to the defined routes, and if a bus fails to operate for a certain length of time it automatically loses the license.

The rules prescribe dimensions and weight of the buses, the strength of the cars, what the reserve equipment shall be, the degree of maintenance, and the condition of the equipment, types of tires, diagram of gear shifts and hours of service.

The regulations go into the subjects of conduct by the operators, application of the rules and penalties.

The rules will not be put into final form until after the public hearing. They are the first rules proposed for the control of the jitney or bus business in Massachusetts.

Bus Lines in New York City by July 1

Another step in the plan for New York City-wide bus operation was mounted on Feb. 17 when an amicable agreement was reached by the subcommittee of Mayor Walker's transit conference on the bus routes. Speaking for the sub-committee, which includes members of the State Transit Commission and the Board of Transportation, Joseph V. McKee, Aldermanic President, announced his belief that franchises for bus lines in all the boroughs would be awarded by the Board of Estimate within a few weeks so as to give the successful bidders sufficient time to acquire equipment to be placed in service on July 1, the date on which Mr. McKee believes city-wide bus operation can be effectively realized. This belief he announced at the close of a conference held in the City Hall, in which the Board of Transportation was represented by Commissioner Daniel L. Ryan and the Transit Commission by Commissioner LeRoy T. Harkness.

The routes, numbering 55 in four boroughs, will first be presented to the Mayor's transit conference and later to the Board of Estimate for official adoption. The President of the Board of Aldermen said that the routes adopted by the committee followed closely those recommended in the latest report by the Board of Transportation, of which John H. Delaney is chairman, together with the incorporation of certain of the modifying suggestions made by the Borough Presidents for routes in their respective boroughs. He intimated that while it might be found necessary to incorporate in the scheme some minor alteration, the principal features of the routes as suggested by the Board of Transportation had found favor with all in the "get-together" conferences.

With an agreement on routes assured, the question of franchises and general operating policies will be taken up. The problem, in Mr. McKee's opinion, lay in determining upon a policy of awarding borough-wide franchises for the most part or of awarding franchises for only partial borough operation to individual bidders.

Thirty-five-Mile Bus Line Proposed in New York

The Buffalo & Erie Coach Corporation a subsidiary of the Buffalo & Erie Railway, proposes to operate buses between Jamestown and Westfield, N. Y., over a route now served in part by a line of the Chautauqua Traction Company soon to be abandoned by permission of the State Public Service Commission. The proposed line would be 35 miles long. The bus company will apply for franchises at once to the Jamestown Council, it was announced, following a conference on Feb. 8 at Jamestown of citizens, representatives of the Broadhead traction interests and of the Buffalo & Erie Railway. The corporation agrees to carry no local passengers within Jamestown and between Jamestown and Asheville or intermediate points, this territory to be served by the Jamestown Street Railway, a Broadhead Corporation, when the Chautauqua Traction Company ceases operation.

Higher Fares Allowed. — Increased fare schedules have been ordered by the Indiana Public Service Commission for the bus line operated by the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., and a suspension of service was authorized on part of the line where losses have occurred. The new fares are based on a rate of 3 cents a mile.

Buses Suggested for Relief.—The use of buses to supplement the Municipal Railways of St. Petersburg, Fla., was recommended recently to the City Commission by R. E. Ludwig, director of public utilities. Mr. Ludwig advised the purchase of a fleet of buses to relieve street car congestion during the remaining months of the winter. Meanwhile the railway is being extended.

Competing Buses Removed. — Bus competition with the Weston-York Township-Toronto electric railway line operated by the Toronto Transportation Commission has been discontinued by official order as far as buses operating between Weston and Toronto are concerned. However, a bus line giving a service parallel to the railway from Toronto to a short distance outside the city limits continues in operation. The opening up of the Weston-York Township line has been referred to in these pages.

Buses Authorized in Fort Worth.— The City Council of Fort Worth, Tex., has adopted an ordinance by unanimous vote authorizing the Northern Texas Traction Company to operate buses in Fort Worth in connection with its railway system. No restrictions were imposed on the routing of the buses in view of the fact that their operation is an experiment.

Seeks New Bus Franchise. — The United Traction Company, Albany, N. Y., is seeking a franchise from the Albany Common Council to operate a bus line over New Scotland Avenue. An ordinance has been introduced in behalf of the company. The action of the Common Council must be confirmed by the Public Service Commission. The Albany Transit Company, an independent, is seeking a franchise to operate over the same avenue.

Supplementary Service Under Consideration.—The Birmingham Electric Company, Birmingham, Ala., is contemplating the operation of a number of modern passenger buses to supplement its railway service in several sections of the city. One of the proposed lines would run from East Lake to Huffman, replacing the Roebuck car line, while another would extend from Fairview to Bellview Heights. The matter is now being considered by the City Commission.

New Line in Burlington.—The Iowa Southern Utilities Company will start a temporary bus service in the spring following the authorization to establish a bus line in Burlington, Iowa, to supplant the present South Hill street car line. New buses, of the type now used on the Agency and Mount Pleasant-Bluff road lines are to be ordered, John H. Chase, resident manager, announced. It is said no further replacement of street car lines with buses is contemplated at this time. The company will remove its tracks and pay $12,000 in a series of installments to the city for relieving it of the responsibility of replacing the pavement.

Financial and Corporate

Milwaukee Does Well

$513,110 Increase in Net for 1925—Bus Earnings Represent Substantial Part of Transportation Revenue

Operating revenues of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., from transportation of passengers, freight and express for the year ended Dec. 31, 1925, were $10,615,589, an increase of 2.17 per cent over the year 1924.

Operating revenues of the electric and heating departments were $13,377,063, an increase of 9.92 per cent over 1924.

The percentages of operating revenues of the various utilities appropriated for maintenance and depreciation of physical property were as follows:

	Per Cent
Railway	23.07
Electric light and power	12.34
Heating	17.96

Net income available for the payment of dividends was $2,838,831.

Net capital expenditures for additions to and betterment of property during the year were $4,536,653, after deducting replacements and property withdrawn from service. The principal items have been summarized by the company as follows:

Railway utility	$1,373,212
Electric and heating utilities	1,143,357
Power and miscellaneous	2,020,083

Expenditures in the railway utility include principally the addition of new track at the end of the Vliet Street and First Avenue lines, betterment of approximately 13 miles of track in the city and suburbs of Milwaukee, including heavier type of construction to meet the heavier present-day traffic conditions.

The company acquired a private right-of-way from 35th Street and St. Paul Avenue in a general westerly direction through the Menomonee Valley and the town of Wauwatosa to connect with its present Watertown interurban line at a point just east of the Northwestern belt line crossover in the town of Greenfield. Grading work has been started and some trestle work erected. This improvement, when completed, will permit of a more direct route to the Land O'Lakes over the Waukesha-Oconomowoc-Watertown interurban line and will considerably shorten the schedule running time.

Nineteen new buses were acquired for passenger service on the Wisconsin Motor Bus Lines.

The company purchased a 99-year leasehold and option to purchase on property situated at the southeast corner of Sycamore and Second Streets, directly east and across the street from the Public Service Building. With this acquisition the company now controls a valuable site, which, at present, is being used as a central parking station in connection with the operation of its bus service.

During the year the company continued to obtain a substantial amount of its capital requirements from the sale of preferred stock offered to investors through its securities department.

At a special meeting held Dec. 21, 1925, the stockholders approved the recommendations of the directors that the authorized capital stock be increased from $40,000,000 to $80,000,000, to consist of $40,000,000 preferred capital stock and $40,000,000 common capital stock and that the par value of the common capital stock be changed from $100 a share to $20 a share.

Subject to the approval of the Railroad Commission the directors authorized the issue of $4,000,000 par value of additional 7 per cent preferred stock, of which $700,000 was issued to acquire the capital stock and notes of the Wells Power Company. Of the total amount of $11,000,000 of 7 per cent preferred stock now authorized, $6,896,900 had been issued and was outstanding as at Dec. 31, 1925, and $803,100 par value additional had been subscribed for on the installment plan. The company now has approximately 12,000 holders of its preferred stock, exclusive of subscribers to stock on the installment payment plan.

The only financing done by the company during the year 1925 consisted of the issuance of $1,696,700 par value of 7 per cent preferred stock placed for cash at par. The net additional 7 per cent preferred stock subscribed for under the installment payment plan during the year was $504,800; $150,000 of 5 per cent serial notes matured on July 1, 1925, and were paid; $225,000 of refunding and first mortgage bonds were retired during the year through sinking funds; $6,500,000 of consolidated first mortgage 5 per cent bonds matured on Feb. 1, 1926, and were paid, the cash required therefor having been obtained by the issue and local sale of preferred stock, the purchase of $3,750,000 par value of additional common stock by the North American Edison Company and by cash advanced by the latter company.

At a special meeting held on March 23, 1925, the stockholders voted to accept the "service-at-cost and municipal contract" ordinance passed by the Common Council of the city of Milwaukee on March 2, 1925, and accepted by action of the board of directors of the company on March 9, 1925. This ordinance was approved by the Railroad Commission on March 24, 1925. At the special election held April 7, 1925, the ordinance was defeated by referendum vote of the electorate of the city of Milwaukee and finally rejected.

It is explained that in the transportation revenues of the company there is included a very substantial amount derived from bus operation.

William W. Coleman, Milwaukee, has been elected a director and member of the executive and finance committee to fill the vacancies in these offices created by the death of John I. Beggs, former president of the company.

INCOME ACCOUNT OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

	1925		1924	
Operating revenues		$23,992,653		$22,559,912
Operating Expenses:				
Ordinary operating expenses	$14,415,619		$14,169,176	
Depreciation (reserve credit)	1,847,077		1,627,102	
Taxes	2,160,755		1,757,306	
Total operating expenses		18,423,452		17,553,585
Net operating revenues		$5,569,200		$5,006,327
Non-operating revenues		357,675		252,884
Gross income		$5,926,875		$5,259,211
Interest Charges:				
Interest on funded and unfunded debt	$2,574,457		$2,454,117	
Interest on depreciation reserve balances	471,814		438,978	
Interest on other reserve balances	41,772		40,393	
Total interest charges		$3,088,043		$2,933,489
Net income		$2,838,831		$2,325,721

STATISTICS OF RAILWAY OPERATION AT MILWAUKEE

	1925	1924
Miles of track owned	419.28	418.72
Miles of track leased	1.90	1.56
Miles of revenue track operated	391.49	391.08
Revenue passengers carried	150,591,216	150,857,684
Transfer passengers carried	53,635,554	52,306,065
Per cent transfer to revenue passengers	35.61	34.67
Receipts per revenue passenger	$0.0677	$0.0664
Number of passenger cars owned	861	870
Number of passenger motor buses owned	124	107
Kilowatt station demand (railway and light)	166,200	146,900

Gross Off, but Net Larger, in Indianapolis

Gross earnings of the Indianapolis Street Railway, Indianapolis, Ind., in 1925, the first full calendar year in which a 7-cent basic fare prevailed, were $51,806 less than in 1924. This was made plain in a report for the twelve months filed on Feb. 13 with the Indiana Public Service Commission. The gross last year was $5,536,369. The shrinkage is attributed to increased bus competition and a substantial decline in the total number of passengers carried owing to unfavorable industrial conditions experienced for a part of the year.

Despite the lower gross revenue, however, the report shows a net revenue of $487,741 for the year. In 1924 the net revenue was $484,965. Operating expenses were lower last year than in

EARNINGS OF THE INDIANAPOLIS STREET RAILWAY

	1925	1924
Gross earnings	$5,536,369	$5,588,176
Operating expenses	4,032,821	4,083,749
Net earnings	$1,503,548	$1,504,427
Taxes	$386,624	$384,354
Fixed charges	629,182	635,107
Net revenue	$487,741	$484,965
Sinking fund	$146,566	$130,000
Dividend paid	150,000	300,000
Dividends accrued—not paid	150,000	.....
Total deduction	$446,566	$430,000
Surplus	$41,175	$54,965

1924. Two quarterly dividends during the year were deferred. A condensed statement for the two years is presented in the accompanying table.

Rehabilitation of Detroit United Makes Progress

No financial statement has been issued by the receivers of the Detroit United Railway, Detroit, Mich., for the year 1925. It is probable that some report will be made to the creditors, but the stockholders do not now figure to any extent since their failure to finance the reorganization. Reports have been made for various committees, including those representing the bondholders, but no complete financial report has been issued. Progress in rehabilitating the system is reported by the Security Trust Company, Detroit, receiver. Economies in operation are being effected, but no prophecies are made about the outcome. Rumors of reorganization plans are heard, but nothing definite has materialized.

Another St. Louis Reorganization Move

Rolla Wells, receiver of the United Railways, St. Louis, Mo., on Feb. 13 applied to the United States District Court for permission to enter into a contract with the reorganization committee for the railway whereby $4,200,000 of receiver's certificates will be paid in full in cash and $4,100,000 of underlying bonds will be exchanged for general 4 per cent bonds.

The plan is to have the receiver pay $2,300,000 in cash and the reorganization committee $1,900,000 to take up the receiver's certificates. The underlying bonds would be surrendered by the present holders in exchange for 4 per cent bonds. The reorganization committee would receive $6,000,000 in general 4s for its cash and the underlying bonds to be taken up. There are now outstanding $30,300,000 of the general 4s.

The question of issuing the $6,000,000 of additional general 4s held up the reorganization of the company. There was a serious question about exchanging the underlying bonds for general 4s, but Sam Mitchell, counsel for the bondholders of the St. Louis Transit Company, recently told the court that this objection had been removed. The application of Mr. Wells substantiates Mr. Mitchell's statement. It also indicates that the railway properties will shortly be foreclosed under the $9,790,000 transit bond issue.

The receiver regards it as for the best interest of the company that an early reorganization be brought about and adds that a plan for a friendly foreclosure under the transit company 5 per cent mortgage has been arranged by financial interests of the company.

Outstanding underying bonds due since Oct. 1, 1923, include $1,474,000 of Lindell Railway, $1,640,000 of Cass Avenue & Fairgrounds and $986,000 of Merchants Terminal Railroad.

Disposition of Ohio Interurban Undecided

Sale of the electric light and power properties of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to the Cleveland Electric Illuminating Company, noted in the ELECTRIC RAILWAY JOURNAL for Jan. 23, page 174, naturally provoked questions about the probable disposition of the railway. It is understood now that this is a matter still to be decided. It will probably not work itself out until later. The electric light and power service was the more profitable of the two operations of the company. Since this end of the business has been sold it will remain for future developments to determine whether or not the railway service is to be continued. The railway operates 38 miles of track.

Commission Authorizes 13 Miles Abandoned in Chautauqua

The Public Service Commission on Feb. 5 authorized the Chautauqua Traction Company to abandon that part of its route between Ashville and Mayville, Chautauqua County, a distance of 13.4 miles. Two short sections of track of this company are to be retained, one section, from Lakewood to Ashville, being transferred to the Jamestown Street Railway and the other, in the village of Westfield, being transferred to the Jamestown, Westfield & Northwestern Railroad. The opinion of Commissioner Pooley, who heard the case, points out that the road has sustained substantial losses in every year since 1909, and it has not earned operating expenses in any year since 1918.

He said further that in the last abandonment proceeding it was claimed that the interests controlling both the Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Railroad were diverting business from the traction company to the railroad, and while this claim was not made in this proceeding, the commission was in receipt of communications to that effect, with the intimation also that these companies were not receiving all revenues to which they were entitled by reason of the issuing of passes for free transportation to various persons. The commission has considered the facts and the evidence taken shows that the railroad has not been, and is not, earning its fixed charges; the deficit for the past two years being approximately $50,000 a year. As to free transportation it was shown that at the time the properties came under the control of the representatives of the estates of Messrs. A. N. and S. B. Broadhead, 120 passes were outstanding. This number has since been reduced to 40, and passes have been strictly confined to those who may receive them under the statute.

Syndicate May Purchase West Milton Line

A syndicate composed of residents and shippers living along its route is being organized to purchase the Dayton, Covington & Piqua Traction Company, West Milton, Ohio. The line was offered at a receiver's sale recently and no bids were made. The lowest bid possible for the line, which is 30 miles long, was fixed at $150,000. The syndicate, it was said, contemplates making arrangements with the special master in the receivership, and a new minimum rate may be set. Sale of the line must be approved by Federal Judge Smith Hickenlooper of the Southern district of Ohio before the sale can be consumated.

The commission authorized abandonment of the line a few months ago. In its petition for abandonment the company declared it had been operating at a loss due to automobiles and buses cutting down the patronage.

Receivers Sought for Rockford Properties

Suit for the appointment of a receiver for the Rockford & Interurban Railway and the Rockford City Traction Company, Rockford, Ill., because of non-payment of interest on bonds, has been filed by trustees on demand of the bondholders. The Union Railway, Gas & Electric Company is named a party to the bill. The petitioner is the Continental & Commercial Trust & Savings Bank, Chicago, trustees. The petition is returnable to the April term of court.

The two lines are subject to liens secured by bonds to the amount of $1,650,000. The first issue was in 1902 of $800,000 for construction of the railway and a further issue of $1,459,000 was made for equipment. From earnings, $574,000 bonds were purchased and set aside from time to time as a sinking fund. The entire issue was payable on Oct. 1, 1922, but an extension was arranged until Oct. 1, 1930, all holders, except those whose bonds totaled $32,000, accepting.

At that time, to prevent foreclosure proceedings and the loss of $400,000 of notes held against the company for equipment, the Union Railway, Gas & Electric pledged certain securities. These included notes for $83,675 and an open account for $374,857. Under the agreement for the extension, provision was made for annulment in case the company, as a party to it, did not pay the interest on the bonds. Payments were made until April, 1925, but in October of that year payment was again passed.

The Continental & Commercial Trust & Savings Bank, which is bringing action, has resigned as trustee for holders of the bonds against the interurban lines. The company, however, is still trustee for a $1,650,000 bond issue. In the name of the holders of these

bonds it is instituting the action. The bonds, originally issued to cover local properties and the Belvidere interurban line, also are a lien against the Rockford & Freeport and Rockford, Beloit & Janesville lines to the amount of $1,250,000, but no action is instituted in this case.

$99,929 Surplus at Pittsburgh

For the year recently closed the Pittsburgh Railways, Pittsburgh, Pa., reports a surplus of $99,929. Car riders last year paid an average of 5.77 cents for each ride, according to the railway. This compares with 6.62 cents as average fare for 1924. Weekly, Sunday and holiday passes were largely responsible for this reduction, and in the closing months of 1925 the average fare received was almost 29 per cent less than that for the same period the preceding year.

$1,700,000 in P. R. T. Certificates

Equipment trust certificates of the Philadelphia Rapid Transit Company, Philadelphia, Pa., to the amount of $1,700,000, bearing interest at 5 per cent and priced to yield about 4.75 to 5.35 per cent, are being offered by Dillon, Read & Company, New York. These certificates, known as equipment trust, series J, are issued under the Philadelphia plan and will mature in equal annual installments from Feb. 15, 1927, to Feb. 15, 1936. The purpose of the issue is to pay in part for new equipment to be constructed at a total of not less than $2,283,750. The equipment includes 50 standard double-truck vestibule street railway passenger cars, 75 double-deck motor coaches and 60 single-deck motor coaches. The par value of the certificates will represent less than 75 per cent of the cash cost of the equipment. Some facts about this equipment were given in the ELECTRIC RAILWAY JOURNAL, issues of Feb. 6 and Feb. 13.

Long Island Lines to Be Sold

The New York & Long Island Traction Company, New York, N. Y., will be sold at public auction at the County Court House at Mineola, L. I., on Feb. 25, following a ruling of the Supreme Court of Nassau County in pursuance of a judgment of foreclosure and sale brought by the Union Trust Company as trustee plaintiff. The property will be sold in five parcels, including franchises, rolling stock, real estate and certain trackage rights and personal property. The sale will also include the Long Island Electric Railway, which company is also controlled by the Long Island Consolidated Electric Companies. George Le Boutillier, vice-president of the Long Island Railroad, recently announced that the notice of the sale of these companies meant that operation of cars on both lines would be discontinued. The New York & Long Island Traction Compnay operated 41 miles of line, connecting Mineola, Garden City, Freeport and other important points on Long Island and the Long Island Electric operated 25 miles of line connecting Brooklyn and Far Rockaway.

Suit to Hold Up Seattle-Rainier Sale

Fight by Rainier Valley residents to block a referendum vote on the purchase by the city of the Seattle & Rainier Valley Railway was delayed in the Superior Court, when Judge Malcolm Douglas granted the motion of Arthur Schramm, assistant corporation counsel, for a continuance of the hearing on the show cause order issued against City Comptroller Harry W. Carroll. Judge Douglas did not set a definite time for the hearing.

Even if the court action had not been brought, the referendum could not go before the voters at the March 9 election owing to the legal requirement that its validity must be certified 45 days before a regular election. When the referendum is submitted to popular vote, if such proves to be the case, it must be at a special election.

Rainier Valley residents obtained a temporary restraining order preventing the City Comptroller from certifying the petitions to the City Council and restraining the making of a report on the petitions to the Council. The opponents of the referendum proposed assert that the petitions are illegal, that only the petitions which were filed on Dec. 26 and which contained only approximately 4,000 signatures are legal.

Quarterly Earning Statements in Philadelphia. — The income account statement of the Philadelphia Rapid Transit Company, Philadelphia, Pa., heretofore prepared and printed monthly for the information of stockholders, will hereafter be issued quarterly to coincide with the dividend period on P.R.T. common stock. The next income account statement will accordingly be issued during April for the first three months of 1926.

Deficit in 1925.—For the year ended Dec. 31, 1925, the gross income of the Portland Railroad, leased by the Cumberland County Power & Light Company, of Portland, Me., was $1,451,902, against $1,582,264 in 1924. The operating expenses and taxes for 1925 were $1,178,574, against $1,294,781 the year previous. The net income was $25,730 in 1925, against $39,885 in 1924. After the consideration of dividends, which for both years amounted to $99,950, operation in 1925 resulted in a deficit of $74,220, against a deficit of $60,065 in 1924.

Judgment of $110,535 Against Urbana Line.—Settlement of the affairs of the Kankakee & Urbana Traction Company, Urbana, Ill., is progressing rapidly. Judge Smith recently approved the report of the master, without objection, entering judgment for $110,535 against the road and directing its immediate and absolute sale. The date, however, has not yet been set. T. B. Webber, vice-president and secretary of the line, was recently appointed receiver. The property includes trackage and right-of-way from Urbana to Paxton, four cars and a station at Rantoul.

Loan Authorized.—The Indiana Public Service Commission recently approved a petition of the Hammond, Whiting & East Chicago Railway, Hammond, Ind., to negotiate a $20,000 loan and to issue three notes of $24,766 each. The notes will be taken by the Chicago City & Connecting Railways collateral trust. They represent a refunding of the unpaid balance of money advanced to the issuing company in 1918 by the United States Housing Corporation to extend lines and to buy new equipment for increased service to factories engaged in war work.

Business of Railway Concluded.—A decree approving the findings of the receiver in the case of the Alamance Railway and ordering distribution of funds was received recently to be filed in the office of the clerk of the Western North Carolina District Court at Greensboro, N. C. The decree is concerned with the winding up of the affairs of the company and distribution of funds to the bondholders, for whom the American Trust Company, Richmond, Va., is acting. The Alamance Railway formerly operated a street railway system in Burlington and Alamance and between these two towns. Cars have not been run for several years.

Net Income in Worcester, $349,735.—The net income of the Worcester Consolidated Street Railway, Worcester, Mass., for the year ended Dec. 31, 1925, was $349,735, or $7.77 a share, compared with $362,504, or $8.05 a share, in the preceding year. As of Dec. 31, 1925, current assets were $1,208,420 and current liabilities $569,129, leaving net working capital of $639,291. For the quarter ended Dec. 31, 1925, net income was $223,895 after charges, equivalent to $4.97 a share on the 45,000 shares of capital stock outstanding, compared with $53,144, or $1.18 a share, in the corresponding quarter in 1924.

May Discontinue Electric Line. — Contending the service is being operated at a loss of $5,000 a month, the Missouri Pacific Railroad contemplates the discontinuance of the Coal Belt Electric Railway, Marion, Ill. It is reported attorneys for the railroad are preparing briefs to present their case before the Illinois Commerce Commission to discontinue the service. The Coal Belt Electric Railway, operated by the Missouri Pacific, a steam road, is 14 miles long, extending through Marion, Herrin, Carterville and Energy.

Easements Should Be Included in Valuation.—An opinion has been given the Maryland Public Service Commission by Thomas H Robinson, Attorney-General of Maryland, holding that easements should be included in the commission's valuation of the property of the United Railways & Electric Company, Baltimore. Following shortly after the ruling the United made an announcement that no matter what valuation was placed on the property there would be no increase in fares. The present fare is 7½ cents. During the hearings Clarence W. Miles, people's counsel, said that if easements were included it was probable that he would take the case into the courts. Before the commission took any action it sought the opinion of the Attorney-General. Mr. Miles will make a close study of the ruling before he decides what action to take. The United placed a valuation of almost $18,000,000 on easements during the hearing.

Personal Items

John H. Hanna President Capital Traction

Chief Operation Official of Washington Property Made Executive Head of the Company

John H. Hanna, vice-president in charge of operations of the Capital Traction Company, Washington, D. C., for the last ten years, has been elected president to fill the vacancy created by the resignation of George E. Hamilton. His advancement will become effective on March 11, the date of Mr. Hamilton's resignation.

It has, indeed, been a strong combination of talent, this association of Mr. Hamilton and Mr. Hanna on the Washington property. George E. Hamilton knows finance and the law as

J. H. Hanna

few other men do. Equally as much can be said of Mr. Hanna about his familiarity with engineering and his knowledge of transportation. Under the new arrangement of personnel the responsibilities of the two men are readjusted, but the association remains, for, as explained elsewhere in this issue, Mr. Hamilton continues as chairman of the executive committee.

George E. Hamilton makes no pretensions to being a street railway man as that term is generally applied. Neither does Jack Hanna, for that matter. No man, however, can escape the estimate put upon him by his contemporaries. In the case of Jack Hanna that estimate places him well up at the top, if not actually at the top. For 32 years now he has served the one company, a company that reflects, more than do many others, the ideas and ideals of a single officer, now made its head. If ever a property were well kept up, it is the Capital Traction. Remember, too, that it is an underground conduit road. As for the cars, they are the last word in both appurtenances and appearances. Jack Hanna was one of the first men in the industry fully to appreciate the pulling power of paint with the public. He is more than an operator—he is a pioneer. As one instance of this there is the use under his direction of the bus in de luxe service to Chevy Chase, treated in the ELECTRIC RAILWAY JOURNAL for Feb. 13.

It has not all been operation with which Mr. Hanna has had to deal in Washington. Legislators down there may be remiss about other things, but they never lose sight of the fact that Washington is the nation's capital. Civic spirit knows no limit. This is commendable, but it is also distressing at times. Commissions have a say in everything, for there is no elected government. It is in just such situations that Jack Hanna is a diplomat among diplomats. His public relations are of the very best. He is well known and well liked, two things that appear always to go together but do not always do so. With the boys of the district Jack Hanna is aces high, as they say. He is a member of the executive committee of the Washington Council of the Boy Scouts. As a matter of fact, there is not much that is planned for this organization in which Mr. Hanna does not take a hand.

Relation of this particular activity of the man may appear to be far removed from railway operation. It is. But every man is a composite. Few live by bread alone. Jack Hanna likes to fish and he likes to play golf. One of these predilections testifies to the ability of the man to amuse himself when thrown upon his own resources—a great test in this age—and the second testifies to the ability of the man to amuse himself when thrown on somebody else's resources.

Mr. Hanna has long been active in affairs of the American Electric Railway Association. He was president of the Engineering Association 1913-1914, and in addition to being a member of the executive committee in 1925 he had a prominent part in tre work of many other committees. Included among these were the 1925 committee of the mid-year meeting and dinner arrangements, of which he was chairman, the committee on national relations and the committee on subjects and meetings. He was the association's national councilor to the United States Chamber of Commerce. This year he is a member of the executive committee and chairman of its membership committee and chairman of the sub-committee of the national relations committee on depreciation.

After leaving college Mr. Hanna engaged in steam railroad engineering work and then entered the service of the Washington & Georgetown Railroad, predecessor of the present traction company. The following year he was appointed assistant superintendent and four years later became superintendent and assistant engineer of the company. In 1909 he was appointed chief engineer in charge of all construction and maintenance. Then in 1916 he became vice-president.

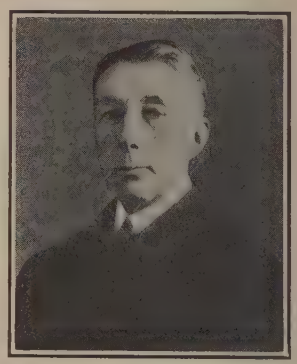
Mr. Hanna was born in Henderson, Ky., in 1871. He acquired his early education in the high and private schools of his home town, and was graduated from Princeton in 1892 with the degree of civil engineer.

C. C. Castle in New Post

Executive Well Known in Equipment Field Joins New American Car & Foundry Motors

C. C. Castle will become actively associated with the American Car & Foundry Motors Corporation on April 1. At that time he will sever the business affiliation with B. A. Hegeman, Jr., which has extended over a long period. For years one of the most outstanding figures in the railway field, Mr. Castle will carry to his new association an enormous amount of prestige and of good will. The name Charlie Castle is a byword on the lips of both old timers and newcomers alike in the industry.

He has been associated with Mr.



C. C. Castle

Hegeman ever since May, 1910, and the milestone of each passing year has testified mutely to the progressive activity of that well-known partnership. As first vice-president of the National Railway Appliance Company, vice-president of the Hegeman-Castle Corporation, vice-president of the Anglo-American Varnish Company and one time vice-president of the Genesco Corporation, Rochester, N. Y., the force of Mr. Castle's personality has long made itself felt. Lately, the press of duties has made it impossible for him to continue as vice-president of the Genesco Corporation and he accordingly resigned from that office and became the secretary of the corporation.

Mr. Castle has for years taken an active interest in the affairs of the electric railway industry. While the American Electric Railway Manufacturers Association was still in existence, he served as president of that organization. He is a manufacturing member of the executive committee of the Railway Supply Manufacturers Association, a member of the finance committee of the New York Railroad Club and a member of the New England Street Railway Club. He belongs to the Railway Club of New York and is a member

of the admissions committee of the Lotos Club of New York.

Prior to his association with Mr. Hegeman, Charlie Castle was vice-president of the Hildreth Varnish Company. In fact, these have been the two principal business affiliations of his long and active career. He was born in Syracuse, N. Y., on a date known only to himself. He early exhibited a penchant for railway affairs. At the age of sixteen he entered the employ of the Merchants Dispatch Transportation Company, Syracuse, N. Y. After a brief period spent in this work, he became attached to the Sherwin-Williams Company and remained with that company for approximately three years. Then came an offer of an opening with the Hildreth Varnish Company and the growth of his extraordinarily wide acquaintanceship throughout the railway field.

R. J. Ritchie Advanced by Fitkin Interests

Ralph J. Ritchie, operating vice-president of the Jersey Central Power & Light Company, southern division, has been transferred to the New York office as operating manager of Fitkin Utilities under the management of the General Engineering & Management Corporation.

Mr. Ritchie's new assignment is a promotion for meritorious service. To him was assigned the difficult task of consolidating the various properties which now comprise the Jersey Central southern group. He had been a year and a half in the territory.

As operating manager Mr. Ritchie will have reporting to him the supervisors of the group divisions of Fitkin utilities.

George E. Hamilton Resigns at Washington

George E. Hamilton has resigned as president of the Capital Traction Company, Washington, D. C., effective March 11, which will be the eighteenth anniversary of his election to that office. His resignation was presented at a meeting of the board of directors on Feb. 11. It was accepted with the understanding that he would continue to serve the company as general counsel and as chairman of the executive committee. Mr. Hamilton gave as his reason for resigning his desire to devote more time to professional employment and personal matters.

When Mr. Hamilton took over the presidency of the Capital Traction Company in 1908 he succeeded the late George P. Dunlop. Mr. Hamilton continued, however, as senior member of the low firm of Hamilton, Colbert, Yerkes & Hamilton. Prior to his assuming the presidency of the company he was a director and legal representative in Washington City of the Baltimore & Ohio Railroad and lecturer on wills and legal ethics in the Georgetown Law School, of which he was formerly dean.

In his official resignation he said the eighteen years of his official life had been "eventful ones in the history of our company—years filled with difficulties overcome, dangers avoided and with fair accomplishment in a safe and useful direction."

W. H. Kennedy Auditor for Chicago Surface Lines

W. H. Kennedy has been appointed auditor of the Chicago Surface Lines, succeeding J. J. Duck, resigned. R. E. Eddy has been promoted from the position of auditor of receipts, which he has held for the past six years, to the position of assistant auditor.

Mr. Kennedy went to the Chicago

W. H. Kennedy

property from the Western United Corporation at Aurora. Previous to that he was for five years assistant treasurer of the Savannah Electric & Power Company, Savannah, Ga. He has been connected with Stone & Webster properties for 25 years, serving, in addition to those mentioned, with the Lowell Electric Light Corporation, Lowell, Mass.; Edison Electric Illuminating Company, Brockton, Mass.; Electric Light & Power Company, North Abington, Mass.; Cape Breton Electric Company, Sydney, N. S.; Keokuk Electric Company, Keokuk, Iowa, and the Houghton County properties, Houghton, Mich.

Previous to his Chicago connections

R. E. Eddy

Mr. Eddy served with so-called Hodenpyl-Hardy companies, including the Springfield Consolidated Railway and the Springfield Gas Company, Springfield, Ill., of which he was assistant secretary; Kalamazoo Gas Company, Michigan Light Company and Consumers' Power Company at Kalamazoo, Mich.

The positions of general auditor, auditor of receipts and auditor of disbursements, the latter held by I. C. Shellenberger, have been discontinued by the Surface Lines.

It is understood that Mr. Duck's status with the Chicago City Railway remains unchanged.

"Pop" Shepherd's Record

Versatile Employee of New Jersey Road in Service Thirty-five Years

Look to your laurels, men in electric railway work who pride yourselves on your records of continuous service in the industry! William H. Shepherd, Jersey City, doesn't actually challenge you, but his record is attracting much attention in New Jersey. Thirty-five years in the railway business with Public Service Railway and predecessor companies—that's the record of Mr. Shepherd. He started Jan. 9, 1891, as a conductor in Jersey City on the Erie Street horse car line of the Jersey City & Bergen Railway, and he is now assistant to the general superintendent of Public Service Railway.

Working as a conductor on various lines of the Jersey City & Bergen Railway and later the Consolidated Traction Company until 1894, Mr. Shepherd was then appointed an inspector. Subsequently, he was starter at various carhouses in Jersey City for the Consolidated Traction and the North Jersey Railway. When the Public Service Railway started in 1903 Mr. Shepherd took a position in the employment office in Hoboken; later was a clerk in the Hudson Division office and in 1904 was transferred to the time-table department. The headquarters of the company were moved to Newark that year and Mr. Shepherd went along to take a position in the passenger agent's department, soliciting special car business. The following year he was transferred back to the time-table department, also in Newark, and remained there until 1923, when he was appointed to his present position. Mr. Shepherd started in the time-table department as a clerk and rose to the position of assistant superintendent of the department.

Popularly known among the trolleymen as "Pop," Mr. Shepherd organized the Public Service Railway Athletic Association and was active in promoting track and field sports, baseball leagues and pool tournaments. The first annual outdoor meet of the association was held in 1912 at Hilton oval, near Newark, and an indoor track meet was held in the Fourth Regiment Armory, Jersey City, the same year. His own ability as an athlete qualified him for this work. In those days he wore the silks of the Scottish-American A. C. Later he joined the Wayne A. C. and gradually changed from distance runner to sprinter, hurdler and jumper. His best mark for the 100-yard dash was 10.1; for the standing broad jump, 10 ft. 3 in., and the standing high jump, 4 ft. 11 in., the latter two marks being made indoors.

As an indication of the popularity of Mr. Shepherd with the rank and file in Public Service Railway, it is recalled

that in 1915, when a New York newspaper conducted a contest to determine the most popular railway man in the Metropolitan district, Mr. Shepherd not only won first prize—a trip to the San Francisco Exposition, with all expenses paid—but, through the loyal support of the trolley men of the Public Service he polled 3,000,000 votes, beating his nearest competitor by almost 1,000,000.

Mr. Shepherd is a member of the veterans' organization of the Fourth New Jersey Infantry. He was a captain in the Fourth Infantry on the border during the Mexican trouble in 1916, and among his treasures is a watch fob given him by the enlisted men of his command, a further proof of the high esteem in which he is generally held.

W. L. Briar Made Shop Supervisor at Kansas City

W. L. Briar has been appointed shop supervisor of the Kansas City Railways, Kansas City, Mo., reporting direct to R. S. Neal, assistant superintendent of equipment. All shop foremen now report to Mr. Briar. To correlate the shop and division mechanical work, all division foremen report to Mr. Briar on all mechanical repairs and replacements. Reports, records, etc., are handled through the office of the assistant superintendent of equipment, with materials handled through the office of supervisor of materials.

Dean W. Flowers, formerly general superintendent for the St. Paul Gas Light Company, has joined the engineering staff of the American Light & Traction Company in San Antonio, Tex. That company at one time controlled the St. Paul Gas Light Company and now owns the San Antonio Public Service Company and other utility organizations.

H. G. Milson has been appointed director of personnel of the Toronto Transportation Commission, Toronto, Canada, replacing Dr. S. G. Mills, who has returned to private practice. W. H. C. Seeley, who served for some time as assistant to Dr. Mills, has been appointed assistant director of personnel.

Henri Camp, general secretary of the Union Internationale de Tramways, de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles, has resigned to engage in business. The executive committee of the association, which is made up of electric railways and bus lines in western Europe, has appointed in his place André de Backer, engineer. Mr. de Backer's appointment dates from Jan. 1, 1926.

Paul Kayser, widely known in newspaper and business circles in Wisconsin, has joined the staff of the Milwaukee Electric Railway & Light Company to take charge of publicity work.

J. M. Markham, general agent of the Northwestern Mutual Life Insurance Company, has been elected president of the City Railway, Dayton, Ohio, succeeding Valentine Winters, who served as president since 1921 and has also been a member of the board for years. Mr. Markham accepted the nomination of the board only under condition that the position be an honorary one and that it carry no compensation. Heretofore the office of president carried a salary of $15,000 a year.

F. P. Snyder General Manager of Oakwood Street Railway

Fred P. Snyder has been appointed general manager of the Oakwood Street Railway, one of the five railway companies entering the city limits of Dayton, Ohio. In announcing his appointment directors of the company said that his experience made him the logical man for the position. Mr. Synder was appointed superintendent of transportation and equipment of the Oakwood Street Railway a few years ago, after several years in charge of the shops. For many years prior to his association with the railway he was associated with

F. P. Snyder

the Barney & Smith Car Company, Dayton. He brought to his railway position a thorough knowledge of car building, maintenance of rolling stock and technical data on electric transportation.

Ed Crawford was recently elected secretary-treasurer of the Shreveport Railways, Shreveport, La. Mr. Crawford is the son of the late Captain Crawford, who was vice-president of the company and one of the pioneers in the Southern transportation field. Captain Crawford was succeeded by Ed Jacobs.

Obituary

Donald McColl

Donald McColl, formerly general manager of the Shanghai Electric Tramways, Shanghai, China, died recently at Seaford, England. For a number of years he was connected with the Glasgow Corporation Tramways, but he left that position to go to Lisbon to become traffic superintendent and chief accountant of the tramways there. Later he returned to England and assumed the position of general assistant to his old Glasgow chief, the late John Young, who at that time was general manager of the London Underground Railways. Mr. McColl took part in the electrification and reorganization of the Metropolitan District Railway, and in the starting and development of three new tube railways in London. In 1908 he was appointed to the Shanghai tramways, owned by a British company. Under his management the tramways there were developed and transformed into a profitable undertaking. Mr. McColl was the author of a standard work on tramway bookkeeping and accounts.

Thomas E. Leahey, superintendent of the line department of the Public Service Railway, Newark, N. J., is dead. He was 59 years of age. Mr. Leahey entered the street railway field in 1889, when he became a lineman for the Newark Passenger Railway, one of the predecessors of the Public Service. When the several street railways merged to form the present traction company Mr. Leahey remained as an employee of the new corporation.

Anthony B. Calvin, well known as an attorney, at Youngstown, Ohio, died from heart disease on Feb. 7. For many years Judge Calvin was counsel for the Youngstown & Suburban Railway. He was born in Mahoning County on March 13, 1877, grew up on his father's farm and was educated in the district schools of the county. He was graduated from Northeastern Ohio Normal College at Canfield in 1897 and in 1900 from the law school of Ohio State University. Following this, he was admitted to the bar and had practiced his profession in Youngstown since that time.

David T. Goff, general roadmaster of the Southern Ohio Public Service Company, Columbus, Ohio, died recently at his home in Newark, Ohio. He had been associated with electric railways from the time of the first interurban lines in Ohio. He helped in the construction of the city lines in Newark and Zanesville and interurban lines connecting Columbus, Newark and Zanesville. With the exception of seven years during which he served as a motorman with the Ohio Electric Railway, he has been in the construction and maintenance of way department of the Ohio Electric Railway and its successor the Columbus, Newark & Zanesville Electric Railway and later the Southern Ohio Public Service Company. He was 64 years old.

Carter Miller, advertising manager of the Timken Roller Bearing Company, Canton, Ohio, is dead. Mr. Miller went with the Timken Company six years ago and was promoted rapidly to various positions both in the field with the Timken Roller Bearing Service & Sales Company and at the home office with the Timken Roller Bearing Company. Later he was placed in charge of the advertising department. Mr. Miller was born in Bay City, Mich. He attended the elementary schools in that city and was graduated from Kenyon College at Gambier, Ohio, in 1919. In the business world he was recognized as a keen analyst of advertising and business problems. His advice and counsel were frequently sought in a consulting capacity in matters connected with advertising and in solving publicity problems.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Oil Men Have Their Say

A Material Stiffening of Prices Is Anticipated—More Uniform Production for the Future

Characterizing as mere propaganda for big advances in prices the statements that the petroleum reserves of the country are in immediate danger of being exhausted, an official of one of the larger oil producing companies declared that such an eventuality need not be looked for now or in the near future. What the industry needs more than anything else at the present time, in his opinion, is a movement toward permanent stabilization of prices and production. The disastrous slumps in oil and gasoline prices and the periods of inordinate profits are alike unjustified.

This applies with telling force in the case of the railways. Whether oils are purchased on a basis of the gallon or on the basis of mileage, it is undesirable to be subjected to heavy fluctuations from one year to the next. The stabilized basis for prices will be arrived at only when all of the larger companies in the field have seen the light and have called off their respective entrants from the "industrial dog fight."

Prices, under this new order of things, will not be low. However, the quality of oils sold will average considerably higher and the various grades will be more uniformly standardized. It is often the case, at present, that an operator using a certain grade of oil will find enormous variations from one delivery to the next. This does not make for economical operation and for proper maintenance procedure. The distributing oil companies cannot be entirely blamed for such a condition at the present time, since the oils are obtained from such widely divergent spots and are produced under varying conditions.

This condition was mentioned by one official as an argument for a monopolistic control of the industry. Only under such an arrangement, he feels, can the shoestring operator be excluded, along with his production of oils of doubtful quality. Whether or not the companies which exercised this control would be content to allow prices to remain at a reasonable level is open to conjecture. However, in a free country, there is nothing to prevent the entrance of outside capital into drilling ventures, in case the leaders become unduly obstreperous in handling the situation.

Two are not one as yet, since one company is predicting an immediate stiffening of prices on both oils and gasoline, while another cannot see any prospect of such a move in the near future. The weight of opinion seems to favor the former view, however, although no one apparently anticipates a major advance within the next few months.

Oil companies are looking with considerable interest upon the ever-increasing adoption of co-ordinated bus and trolley service by the railways. Since the oils used in buses are of a much higher quality than the grades required for street car operation and, further, since buses require vastly larger quantities of oil than do their adopted cousins, the cars, it is quite natural that this new business should look very tempting to the producing companies. While the exigencies of bus lubrication are very complex, as compared with the trolleys, and require much careful study so that they may be properly handled, great strides have been and are being made in this direction.

S. M. Curwen Heads J. G. Brill Company—Other Officers

At an organization meeting of the board of directors of the J. G. Brill Company, Philadelphia, Pa., held on Feb. 11, the following officers were elected: President, Samuel M. Curwen; vice-president, James W. Rawle; treasurer, Edward P. Rawle; secretary, Edmund L. Oerter.

H. W. Wolff, vice-president of the American Car & Foundry Company, was elected a director to fill the unexpired term of Stephen J. Simon, resigned. The selection of Mr. Wolff gives the American Car & Foundry Company five of the nine members of the J. G. Brill Company board. This is in line with the recent formation of the Brill Corporation, a merger on the J. G. Brill Company and American Car & Foundry Company's motor subsidiaries. The Brill Corporation is controlled by American Car & Foundry.

The present personnel of the J. G. Brill Company board is as follows: Samuel M. Curwen, E. P. Rawle, Francis A. Lewis, W. Clarke Mason, W. H. Woodin, W. M. Hager, C. S. Sale, W. C. Dickerman, H. W. Wolff.

Electric Locomotives Now Completely Built in Japan

Japan is making rapid strides in the development of her home industries. As an illustration of this comes the announcement that the Kawasaki Shipbuilding Yard is now manufacturing electric locomotives for use on Japanese railroads. These machines are claimed by the makers to be purely Japanese in all materials, no parts having been imported for use in their erection.

In August last the yard received an order for four 25-ton electric locomotives from the Nippon Denryoku K. K. Two of these were delivered in December and the remaining two are now under process of construction. In addition orders are on hand for twelve units ranging from 41 tons to 73 tons. These will be delivered to various railways in the country, the largest order, for five 55-ton locomotives, going to the Fuji-Minobu Railway.

ELECTRIC RAILWAY MATERIAL PRICES—Feb. 16, 1926

Metals—New York

Copper, electrolytic, cents per lb.	14.275
Lead, cents per lb.	9.125
Nickel, cents per lb.	35 00
Zinc, cents per lb.	7.875
Tin, Straits, cents per lb.	64.25
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	56 00
General service	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.00
Somerset mine run, Boston	2 30
Pittsburgh mine run, Pittsburgh	2.05
Franklin, Ill., screenings, Chicago	1.575
Central, Ill., screenings, Chicago	1.125
Kansas screenings, Kansas City	2.30

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.95
Tie plates (flat type), cents per lb.	2.25
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.25
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	$1.35

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (28 gage), cents per lb.	3.25
Sheet iron, galvanized (28 gage), cents per lb.	4.50
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.*	11.70
White lead in oil (100 lb. keg), cents per lb.	15.50
Turpentine (bbl. lots), per gal.	$0.97
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

* Prices f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	17.75

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq. yd.	$2.70
Paving brick 3½ x 8½ x 4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu. yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu. yd., f.o.b. N. Y.	1.75
Sand, cu. yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.875
Light copper, cents per lb.	10.00
Heavy brass, cents per lb.	7.375
Zinc, old scrap, cents per lb.	4 75
Lead, cents per lb. (heavy)	7 625
Steel car axles, Chicago, net ton	$17.75
Cast iron car wheels, Chicago, gross ton	17 25
Rails (short), Chicago, gross ton	17.75
Rails, (relaying), Chicago, gross ton	25.50
Machine turnings, Chicago, gross ton	9.00

*The method of selling linseed oil on a gallon basis has been changed and all sellers now quote on a pound basis.

Data on New Equipment for South Bend

Specifications on a considerable number of cars and electric locomotives ordered some time ago by the Chicago, South Shore & South Bend Railroad, Chicago, Ill., have just become available. This road, now an Insull property, has embarked upon an extensive campaign of modernization and the new rolling stock, which is detailed here, constitutes an important move in this program.

Regular passenger equipment ordered consists of ten combination baggage and passenger motor cars seating 44; six cars with inclosed smoking compartments, seating 48, and nine passenger cars without special modifications, seating 56. These cars are being built by Pullman Company. They were ordered on Aug. 1, 1925, for delivery on June 1 of this year. The specifications follow:

Seating capacity	56
Weights:	
Car body	62,500 lb.
Trucks	32,000 lb.
Equipment	25,500 lb.
Total	120,000 lb.
Bolster centers, length	38 ft. 0 in.
Length over all	60 ft. 0 in.
Truck wheelbase	7 ft. 0 in.
Width over all	9 ft. 9½ in.
Height, rail to trolley base	14 ft. 4⅜ in.
Body	Steel
Interior trim	Mahogany
Headlining	Steel
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Plain
Axles	Standard Steel, heat treated
Car signal system	Faraday single stroke bell
Car trimmings	Adams & Westlake
Side bearings	Stucki
Compressors	D-3-F
Control	Westinghouse
Couplers	Tomlinson
Curtain fixtures	Railway Curtain Supply
Curtain material	Pantasote
Destination signs	Electric Service Supplies
Gears and pinions	Nuttall
Hand brakes	Peacock
Heater equipment	Peter Smith and Railway Utility
Headlights	Electric Service Supplies
Journal boxes	Symington
Lightning arresters	Westinghouse
Motors	Four Westinghouse No. 567-C-7, inside hung
Paint	Chicago Varnish
Sanders	Ohio Brass
Sash fixtures	O. M. Edwards
Seats	Hale-Kilburn
Seating material	Chase Frieze Plush, grade C
Slack adjuster	Westinghouse
Springs	Baldwin Locomotive Works
Step treads	Stanwood self-clearing
Trolley base	Westinghouse
Trolley shoes	Miller
Trucks	Baldwin
Ventilators	Railway Utility
Wheels	Steel, 36 in. A. R. A.
Special devices	One Westinghouse pantograph per car

Special rolling stock ordered includes two parlor-observation trailers with seating capacities of 21 and two dining car trailers seating 24 passengers. These units were ordered in December from the Pullman Company and are to be delivered in July. The specifications follow:

Length over all	64 ft. 0 in.
Truck wheelbase	11 ft. 0 in.
Width over all	9 ft. 9½ in.
Body	Steel
Headlining	Steel
Roof	Arch
Air brakes	Westinghouse
Axles	Heat-treated
Car signal system	Faraday
Car trimmings	Bronze
Side bearings	Stucki
Control	Westinghouse
Couplers	Tomlinson MCB
Curtain fixtures	Railway Curtain Supply
Curtain material	Pantasote, silk lined
Hand brakes	Peacock
Heater equipment	Peter Smith and Railway Utility
Headlights	Electric Service Supplies
Journal bearings	Plain
Journal boxes	Symington
Paint	Chicago Varnish
Sash fixtures	O. M. Edwards
Seats	Pullman chairs
Seating material	Leather
Slack adjuster	Westinghouse
Step treads	Stanwood
Trucks	Commonwealth Steel Co., six-wheel
Ventilators	Railway Utility
Wheels	36-in. A.R.A.

Four locomotives are also being constructed for this road. Baldwin Locomotive Works is the builder and delivery is expected to be made on June 1. They were ordered Sept. 21, 1925. Specifications for these units are given here:

Weights:	
Body and trucks	102,379 lb.
Equipment	57,621 lb.
Total	160,000 lb.
Bolster centers, length	18 ft. 4 in.
Length over all	39 ft. 4 in.
Truck wheelbase	8 ft. 8 in.
Width over all	10 ft. 7 in.
Height, rail to trolley base	12 ft. 1½ in.
Body	Steel
Air brakes	Westinghouse
Axles	Standard Steel
Compressors	Two Westinghouse D3-F
Control	Westinghouse
Couplers	Tomlinson M.C.B.
Gears and pinions	Nuttall, grade B-P
Hand brakes	Peacock
Heater equipment	Railway Utility
Headlights	Electric Service Supplies
Journal boxes	Symington
Lightning arresters	Westinghouse
Motors, type and number	4 Westinghouse No. 3553
Motors	Inside hung
Sanders	Ohio Brass, Form 1
Springs	Baldwin
Trolley base	Westinghouse
Trolley wheels or shoes	Miller and Pantograph
Trucks	Baldwin
Wheels (type and size)	42-in. tired
Special devices, etc.	Sirocco blowers, fan for motor ventilation

New Merger in Rubber Field

Financial interests of the Hewitt Rubber Company, Buffalo, N. Y., and the Gutta Percha & Rubber Manufacturing Company, New York and Brooklyn, have recently been merged. At a reorganization meeting held in Buffalo, N. Y., F. E. Miller was elected president of the Gutta Percha & Rubber Manufacturing Company, John H. Kelly and Amadee Spadone were elected vice-presidents and W. J. Magee became secretary and treasurer. The reorganization is the first step in the removal of the company's plant, office and other facilities to Buffalo. The company will continue the manufacture of corded fabric tires and mechanical rubber goods. It is expected that the personnel of the two merged companies will remain unchanged.

Turbine Drive for Boiler Feed Pump

Numerous advantages in favor of the use of turbine-driven boiler feed pumps are shown in the report of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio. A year ago the company replaced two steam pumps with one General Electric 60-hp., style D-51, two-stage turbine-driven centrifugal pump. The total annual saving has been $663, a return of 28.9 per cent on the investment. The pumps are now held as standby.

Although the new unit has 50 per cent greater capacity than the two previous pumps, it occupies only one-fourth the floor space. Its water rate is approximately 20 per cent less than the water rates of the Duplex pumps. The turbine has required no repairs, whereas the pumps averaged $235 a year for repairs and renewal of parts. Only one-fifth as much time is now required for attendance, and the oil consumption has been cut from one gallon a day to one-half gallon a month. The turbine operates with a minimum of noise and vibration.

Temporary Relief for Shortage of Equipment in Detroit

Detroit Department of Street Railways has been authorized by the City Council to rent from the Peoples Motor Coach Company, a subsidiary of the Detroit United Railway, ten single-deck 25-passenger motor coaches on a basis of 8 cents per coach-mile.

H. U. Wallace, general manager of the D.S.R., is quoted as recommending the rental of the coaches until such time as the department is in position to add to its own equipment. The department is having difficulty to give proper service on existing coach lines due to lack of sufficient equipment. A large number of the street cars still in operation by the D.S.R. that were taken over from the Detroit United Railway are reported to be in very poor condition, and this condition enhances the need for new equipment including both street cars and motor coaches.

Mack Sales to Traction Companies

Among recent sales of Mack buses to electric railways by the International Motor Company are the following:

Beaver Valley Motor Coach Company, New Brighton, Pa., one 25-passenger city type, for operation between Leetsdale, Ambridge and Beaver Falls. Zone fare system, 5-mile route, 10 cents per zone.

Savannah Electric & Power Company, Savannah, Ga., one 29-passenger city type, trolley substitution in Savannah. Fare, 7 cents.

Twin City Motor Bus Company, St. Paul, Minn., seven 230-in. chassis, Eckland bodies, for operation between Minneapolis and St. Paul, a 12-mile route at a 25-cent fare.

Los Angeles Railway, Los Angeles, Cal., three 230-in. chassis, for operation at a 5-cent fare over a 3.06 mile route on Alvarado Street.

Yakima Valley Transportation Company, Yakima, Wash., a subsidiary of the Union Pacific Railroad, one 29-passenger city type, for operation on the Summit View line in place of trolley cars over a 3-mile route at a 10-cent fare.

Utah Light & Traction Company, Salt Lake City, Utah, one 29-passenger city type to operate as a feeder to trolley line over a 6-mile route between Sugar House and Mill Creek for a 10-cent fare.

Boston Elevated Railway, Boston, Mass., three 29-passenger city type, for operation on Boston and vicinity routes.

Rochester Railways Co-ordinated Bus Line, Rochester, N. Y., part of New York Railway System, one 25-passenger city type bus.

Cincinnati Gets 54 Buses

Cincinnati Street Railway is purchasing 29 Mack buses, equipped with Bender bodies; eighteen Six-Wheel chassis, with Kuhlman bodies, and seven Schacht chassis, the bodies for which have not been determined. Permits were issued on Feb. 18 for operation on all bus lines except route H.

Samuel M. Curwen Sees Enlarged Market for Transportation Vehicles

President of New Brill Corporation Outlines the Advantages of Recent Merger—Expresses Confidence and Optimism Relative to the Electric Railway Situation—Sees Dawn of New Era of Usefulness and Prosperity

AN INTERVIEW

By Charles Gordon

IT IS significant that the recent combination of Brill and American Car & Foundry resources comes at a time when the electric railway industry is just entering a new era; when concrete evidence is available of the opportunity for intensive development of facilities, and when interest in improved electric railway equipment is growing rapidly. The new Brill Corporation, which Samuel M. Curwen now heads as president, links enormous financial and manufacturing facilities for the construction of all forms of common carrier transportation—steam, electric and automotive vehicles for both highway and rail operation.

What are the advantages of this combination to the purchasers of electric railway cars and equipment?

How will it affect the design, manufacturing and sales organizations of the several companies controlled by the new Brill Corporation?

Are any changes contemplated in the character of work at the various Brill plants now building electric railway cars?

Does this consolidation indicate a belief that the electric railway field has arrived at a point where its recovery and expansion may be hastened by mustering to its service greatly expanded design, manufacturing and merchandising facilities?

Samuel Curwen

Outlines Plans of Company

Back of every great development is a strong personality. History itself is only a record of the lives of the men who made it. So, also, in following the development and expansion of great industrial enterprises, back of the physical framework and shell of the structure there is found a dominating personality which supplied the imagination, courage, will power and driving force to rear it and give it life. There the man is found.

The industry is naturally interested at this time in getting the viewpoint of Sam Curwen, as he is best known among his many close friends. Although busily engaged in clearing up the details connected with the present changes, he consented to outline the present plans of the companies now brought together and in addition expressed a view of the electric railway situation which in itself radiates confidence and optimism for the future.

To the purchasers of electric railway equipment, the advantages of the recent merger, while indirect only, are nevertheless of outstanding importance at this particular time, according to Mr. Curwen. The new Brill Corporation, control of whose common stock rests with the American Car & Foundry Company, is primarily a holding company, organized to take over the various subsidiary plants that are thus drawn together for greater co-ordination of effort. In this combination are included two groups of properties. One group consists of the J. G. Brill Company, with its subsidiaries — the G. C. Kuhlman Car Company, in Cleveland, the American Car Company, in St. Louis, the Wason Manufacturing Company, in Springfield, Mass., and the Cie J. G. Brill in France. The second group consists of the new American Car & Foundry Motors Company, made up of the Hall-Scott Motors Corporation and the Fageol Motor Car Company of Ohio. By drawing together these large facilities for the production of both rail and highway transportation equipment, he pointed out, additional impetus will be given to the development of both forms of vehicles.

RAPIDLY growing confidence in the electric railway situation and interest in the improvement of electric railway equipment give added significance to the recent merger of Brill and American Car & Foundry resources. This is the first of a series of interviews with car builders and other prominent manufacturers regarding the outlook for the industry.

Mr. Curwen shed further light on the plans for the immediate future. These do not contemplate any material changes in the functions of the various plants. While the future may dictate the combination of the present automotive rail car and bus body products of the Philadelphia and Cleveland plants of the Brill Company with the other automotive activity of the American Car & Foundry Motors Company, no changes of this character are contemplated for the present. He indicated that the products of the Philadelphia plant, the Fageol Company of Ohio and the Kuhlman plant in Cleveland will continue to be offered to the trade.

The J. G. Brill Company, Mr. Curwen explained, will continue its long-established policy of building electric cars and their trucks for both domestic and export shipment. Through many years these products have become known and have built up a reputation throughout the world. The process of development and improvement will be continued. The extent to which this has been carried on in the past, he pointed out, is attested by the many patents granted the company covering devices developed by its engineers for improving the performance of cars and increasing the comfort afforded passengers. The seaboard location of the Philadelphia plant and the facilities for shipment of electric railway and self-propelled cars adapt it admirably for export business.

So far as present plans contemplate, the four present Brill plants are considered to be so situated in their respective territories as to avoid unnecessary heavy freight charges in the shipment of their products to electric railways in various parts of the country. It seems logical that this territorial arrangement will continue to be advantageous.

Mr. Curwen expressed the utmost confidence in the future of the electric railway industry. He declared that there is no intention of subordinating electric railway car development and

production to bus or self-propelled cars. Through the combination of interests represented, it is the intention to develop and cultivate intensively every form of public transportation on steam railroads, electric railways and highways.

Buses to Play Important Part

Since the manufacture of buses looms as an important part of the new company's activities we passed to that subject. Mr. Curwen held that the extent to which the bus may in the future be applied as part of the transportation system of the country is as yet a matter for conjecture. He pointed out that the bus has been definitely proved to have an important part to play in feeder service and through districts where a de luxe service at higher fares than mass transportation agencies is desired. In new territories, where the character of future development is uncertain, the flexibility of the bus offers an opportunity of extending transportation service at minimum initial expense until such time as the volume of riding justifies the investment in rail and overhead line. Its more economical operation, and its apparent superiority of facilities for quick loading and unloading of passengers, makes the use of the street car imperative where the volume of riding approaches mass transportation conditions.

This answer was made to a question regarding the extent to which Mr. Curwen expected to see the bus play an active part in the future local transportation scheme of the country. But he went further. He pointed to increased parking congestion difficulties in large cities as a reason for a growing field for application of de luxe bus service at substantially higher fares than electric cars, and predicted that there would be a large increase in demand for such transportation agencies to replace the use of private automobiles for travel in the congested portions of large cities. There was little doubt in Mr. Curwen's mind of the future usefulness of the bus.

Has Intimate Knowledge of Car Development

Here the discussion centered more definitely on the electric railway car and the future of the industry itself. Mr. Curwen's knowledge of cars, trucks and equipment comes from detailed contact with their design, construction and operation. Prior to 1891, when he became a general salesman for the Brill Company under John A. Brill, he had worked his way through the drafting department to the position of chief draftsman. From the position of salesman he became assistant general manager and in 1903 was made general manager. In 1908, upon the death of John A. Brill, he became first vice-president, and in 1912 succeeded James Rawle to the presidency.

Not even after he was carrying heavy executive responsibilities did Mr. Curwen relinquish close contact with the improvement of the company's products. Careful study of the operating problems of the industry enabled him to foresee its requirements and resulted in the development of many of the valuable patents owned by the company.

With this background of experience to draw from, I sought his opinion on the status of car design and on the outlook for the electric railway industry.

"The car exhibits at the Atlantic City convention last fall to my mind showed that the electric car can be made as attractive as the automotive vehicle," he said. "It is necessary, however, in refining the electric car to bear in mind that its service is to the masses, and that while a part of the public would be willing to pay the higher rate of fare necessary to maintain such refinements, it is questionable whether passengers generally are not more interested in reaching their destinations with the quickest dispatch. While comfort is important, it is subordinated to the other functions of the electric car in handling large crowds quickly."

"What, in your opinion, is the outlook for electric railway car purchases during 1926?" I asked.

"From present indications the outlook is very promising and the large number of inquiries for new cars shows a tendency on the part of electric railways to recognize the advantages of up-to-date equipment. With the knowledge that it will be profitable to replace many of the obsolete cars now in service and with convenient financing facilities available, it is probable that electric railways will retire this year many of the cars which they know are costing them much more to operate in comparison with new equipment than the interest requirements on the investment in new cars."

How the operating managements in the industry can co-operate in bringing about improved design of cars and in lowering manufacturing costs seemed an important angle of the subject. In Mr. Curwen's opinion, precedent and purchasing methods have much to do with this question. He pointed out that it has been traditional in the industry to specialize in types of rolling stock to suit individual ideas of design. This, he explained, is not economical. Car builders are willing to build whatever the customer wants, provided the latter is prepared to pay the additional cost of special design and construction. He indicated that manufacturing costs would be lowered by more uniformity in design.

Interurbans Have Important Place

Our discussion closed on the subject of the outlook for the interurban lines of the country. Mr. Curwen was optimistic in his view of their future usefulness, except of course in those instances where conditions did not warrant the construction of lines in the first place. He pointed to the examples of roads in which the application of light-weight and modern equipment by greatly decreasing the cost of operation has resulted in vast improvement of situations formerly held to be hopeless. He is convinced that the spread of this process to other properties will be followed by a period of renewed prosperity and usefulness for many interurban lines. He held that the ease of maintaining schedules and the comparatively high degree of safety of the interurban make it a transportation agency which, with proper facilities, has a valuable function and service to perform.

Rolling Stock

Cleveland Railway, Cleveland, Ohio, has before the Council for action a program of improvement totaling $5,000,000 which calls, among other things, for the purchase of 100 new cars and a similar number of buses.

British Columbia Electric Railway, Vancouver, B. C., intends to order some new equipment. One authority states that the equipment will probably consist of four two-car trains and eight single cars.

Hydro Electric Railways, Toronto, Canada, is awaiting delivery of twelve cars for Windsor offered to the radial department of the Provincial Hydro Commission under $10,000 each. The cars have been inspected and pronounced suitable for use in Windsor. Five new cars have also been ordered by the company and will be delivered in three or four weeks.

Municipal Railway, San Francisco, Cal., plans to purchase fifteen or twenty cars, at a cost of $255,000 and $340,000 respectively.

Union Traction Company of Indiana, Anderson, Ind., through Arthur W. Brady, receiver, has prepared a petition asking authority to purchase sixteen buses. The approximate cost will be $135,000. The purchase will include eleven of the large type passenger buses that have been in use on the Hoosier Stage line. The five others are to be buses for use on city lines in Muncie and Anderson, Ind. The transaction has been sanctioned by the Indiana Public Service Commission and all that now remains to complete the deal is the sanction of the Circuit Court at Anderson.

New York Railways Corporation is contemplating the purchase of 25 additional buses for experimental purposes in the co-ordination of bus and trolley service. These buses will be single-deck units of the same general type as the sample bus which was designed by the company last summer and described in detail in ELECTRIC RAILWAY JOURNAL of Sept. 5. No franchise has been received for the regular operation of buses as yet, but the application has been filed for some time.

Track and Line

Binghamton Railway, Binghamton, N. Y., will construct an extension along Floral Avenue in Johnson City from Askley Avenue to Riverside Drive. The evidence showed that the village authorities, the residents of Floral Avenue and the company have agreed on the paving of the street and the extension of the trolley line under its franchises. The Public Service Commission has approved the extension.

Philadelphia Rapid Transit Company, Philadelphia, Pa., has submitted plans for laying a double track on Erie Avenue from Second Street to Torresdale Avenue and on Torresdale Avenue to Frankford Avenue. The track extension will provide a cross-city route for the accommodation of the public in the northeast section.

Pointing the Way to Success

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MODERN CARS

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An investigation will show what can be accomplished with MODERN CARS in reducing operating and maintenance costs, and increasing revenue by stimulating the riding habit.

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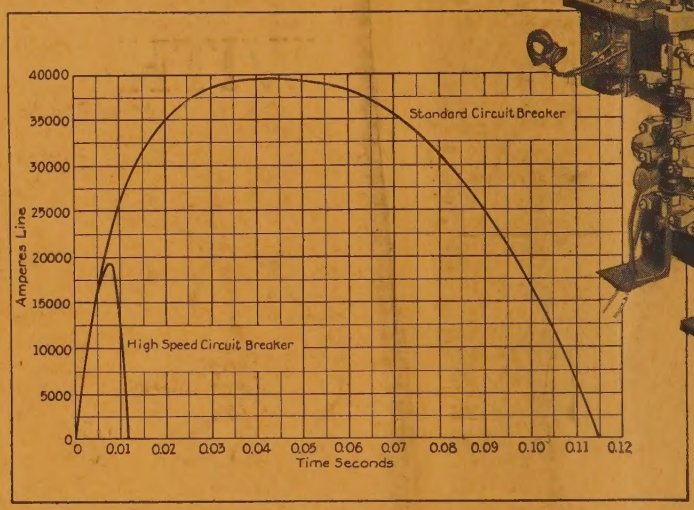
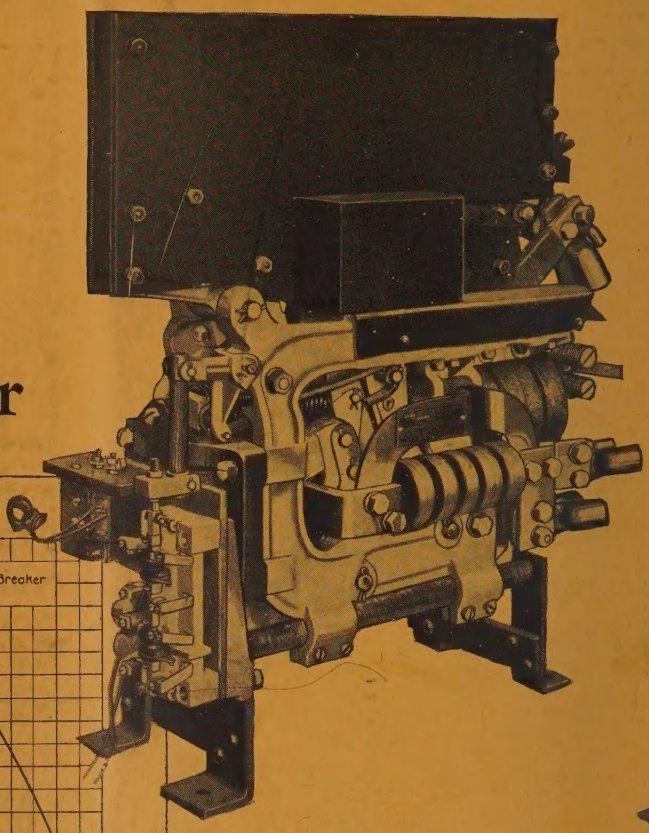
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

The G-E High-Speed Circuit Breaker





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This type of circuit breaker has been uniformly successful in protecting substation apparatus, substation feeders, and electric locomotives. The reduction in current and flashing that results from its use greatly decreases wear of commutator and brushes and practically eliminates damage from internal grounding. It also insures greater reliability and lower substation maintenance.

3-14

GENERAL ELECTRIC